

PH1200A280

EVALUATION DATA

型式データ

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使用記号 Terminology used

Definition		
Vin	入力電圧	Input voltage
Vo	出力電圧	Output voltage
Vcnt.....	CNT電圧	CNT voltage
Iin	入力電流	Input current
Io	出力電流	Output current
Tbp	ベースプレート温度	Base-plate temperature
Ta	周囲温度	Ambient temperature
f	周波数	Frequency

※ 当社測定条件における結果であり、参考値としてお考え願います。

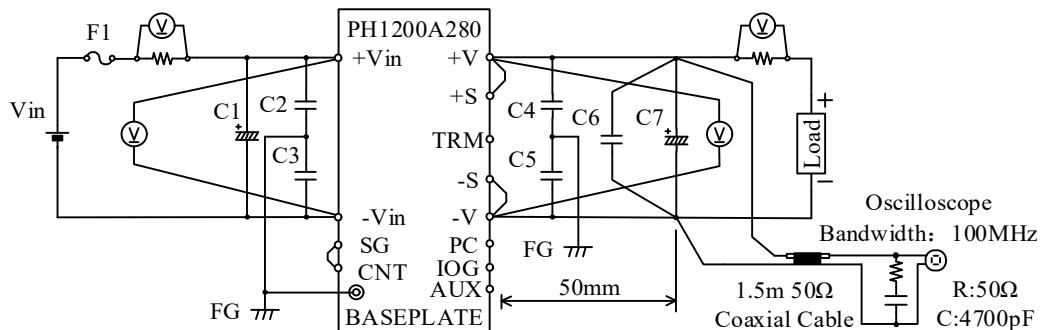
Test results are reference data based on our measurement condition.

1. 評価方法 Evaluation Method

1.1 測定回路 Measurement Circuits

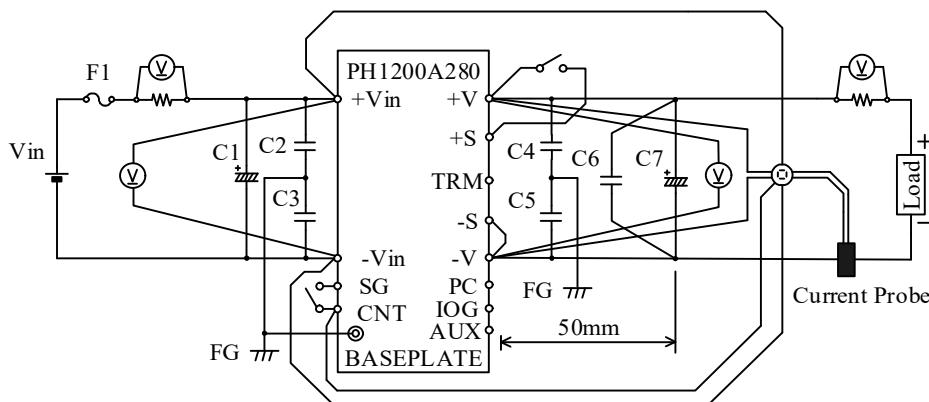
- (1) 静特性、過電流保護特性、出力リップル・ノイズ波形

Steady state characteristics, Over current protection (OCP) characteristics, and Output ripple and noise waveform



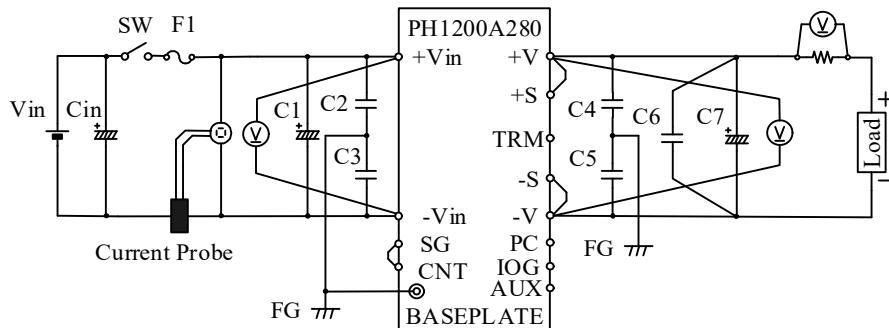
- (2) 過渡応答、過電圧保護特性、その他

Dynamic response, Over voltage protection (OVP) characteristics and Other characteristics



- (3) 入力サージ電流(突入電流)特性

Inrush current characteristics



F1 : 500VDC, 10A (WN30-10)

C1 : 22μF Electrolytic Capacitor

C2,C3 : 4,700pF Ceramic Capacitor

C4,C5 : 0.022μF Film Capacitor

C6 : 2.2μF Ceramic Capacitor

Cin : 10,000μF Electrolytic Capacitor

C7 12V: 1,500μF×2 Parallel Electrolytic Capacitor

24V: 1,500μF Electrolytic Capacitor

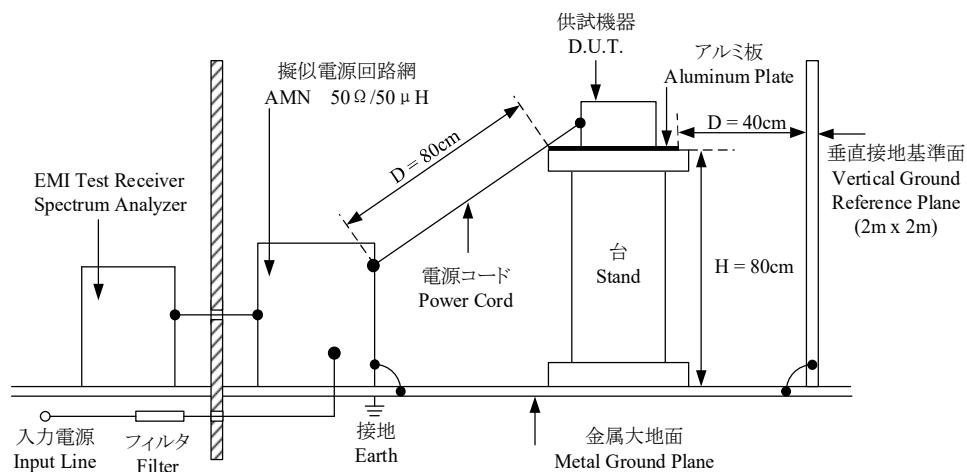
28V: 1,500μF Electrolytic Capacitor

36V: 560μF×2 Parallel Electrolytic Capacitor

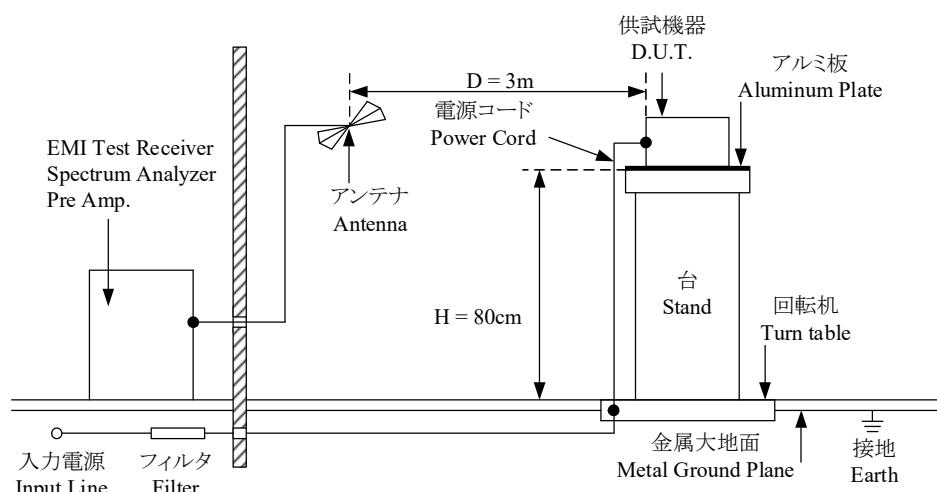
48V: 1,500μF×2 Series Electrolytic Capacitor

(4) EMI特性 Electro-Magnetic Interference characteristics

(a) 雑音端子電圧(帰還ノイズ) Conducted Emission Noise



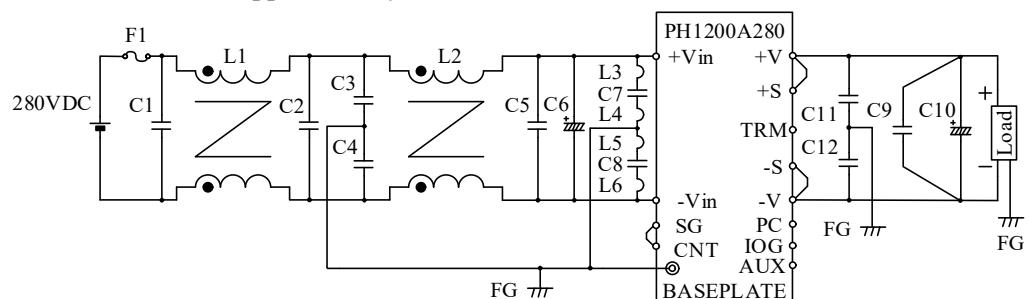
(b) 雑音電界強度(輻射ノイズ) Radiated Emission Noise



*入出力ケーブルとしてシールドケーブルを使用
Shielded cable used to input and output cable.

VCCI class A対応アプリケーションシステム

VCCI class A application system



F1 : 500VDC, 10A (WN30-10)

C1,C2,C5 : 0.68μF Film Capacitor

C3,C4,C7,C8 : 2,200pF Ceramic Capacitor

C6 : 22μF Electrolytic Capacitor

C9 : 2.2μF Ceramic Capacitor

L1 : 5.0mH

L2 : 3.8mH

C10 : 12V-1,500μF×2 Parallel Electrolytic Capacitor

: 24V-1,500μF Electrolytic Capacitor

: 28V-1,500μF Electrolytic Capacitor

: 36V-560μF×2 Parallel Electrolytic Capacitor

: 48V-1,500μF×2 Series Electrolytic Capacitor

C11,C12 : 0.022μF Film Capacitor

L3,L4,L5,L6 : Bead Core (HF57BB3.35X2X2)

*詳細なパラメータ情報については、次ページをご参照ください。

Refer to the next page for detailed parameter information.

*詳細な周辺パラメータ情報(参照用)

The detailed peripheral parameter information (for reference)

	SYMBOL	PRODUCT TYPE	ITEM DESCRIPTION	NOTE	MANUFACTURER
1	F1	Fuse	WN30-10	500VDC, 10A	Walter
2	C1,C2,C5	Cap., Film	ECQU2A684ML	275V, 0.68μ	Panasonic
3	C3,C4,C7,C8	Cap., Ceramic(AC)	DE1E3KX222MJ4BN04F	250V, 2,200p	MURATA
4	C6	Cap., Elect	UCS2W220MHD	450V, 22μ	NICHICON
5	C9	MLCC	C3225X7R2A225KT	100V, 2.2μ	TDK
6	C10	12V Model	Cap., Elect ×2 Parallel	ELXY250ELL152MK30S	25V, 1,500μ
7		24V Model	Cap., Elect	ELXY500ELL152ML40S	50V, 1,500μ
8		28V Model	Cap., Elect	ELXY500ELL152ML40S	50V, 1,500μ
9		36V Model	Cap., Elect ×2 Parallel	ELXY630ELL561MK40S	63V, 560μ
10		48V Model	Cap., Elect ×2 Series	ELXY500ELL152ML40S	50V, 1,500μ
11	C11,C12	Cap., Film	MMCF0630K22300000100	630V, 0.022μ	NISSEI
12	L1	Noise Filter Coil	CV5A0050SBS	5.0mH, 10A	TNC
13	L2	Noise Filter Coil	CV5A1038SBS	3.8mH, 11A	TNC
14	L3,L4,L5,L6	Bead Core	HF57BB3.35X2X2		TDK

1.2 使用測定機器 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	AMN	SCHWARZBECK	NNLK8121
2	ANTENNA(BI-LOG ANTENNA)	TESEQ	CBL6111D
3	CONTROLLED TEMP. CHAMBER	ESPEC CORP.	SU-662
4	CURRENT PROBE	YOKOGAWA ELECT.	701930
5	CURRENT PROBE AMPLIFIER	YOKOGAWA ELECT.	700938
6	CVCF	KIKUSUI	PCR2000L
7	DC POWER SUPPLY	TDK-Lambda	GEN600-8.5
8	DIGITAL MULTIMETER	Agilent	34970A
9	DIGITAL POWER METER	YOKOGAWA ELECT.	WT210
10	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DLM2054
11	DYNAMIC DUMMY LOAD	Chroma	63203A
12	EMI TEST RECEIVER SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESCI
13	PRE AMP.	SONOMA	310N
14	SHUNT RESISTER	YOKOGAWA ELECT.	2215

2. 特性データ Characteristics

2.1 静特性 Steady state data

(1) 入力変動、負荷変動、温度変動 Line regulation, Load regulation, Temperature drift

12V

1. Line regulation and Load regulation

Condition Tbp : 25°C

Io \ Vin	200VDC	210VDC	280VDC	425VDC	Line regulation	
0%	12.020V	12.020V	12.020V	12.020V	1mV	0.004%
50%	12.031V	12.030V	12.030V	12.030V	1mV	0.004%
100%	12.037V	12.041V	12.041V	12.041V	4mV	0.030%
Load regulation	17mV	21mV	21mV	21mV		
	0.142%	0.173%	0.173%	0.172%		

2. Temperature drift

Conditions Vin : 280VDC

Io : 100%

Tbp	-40°C	+25°C	+100°C	Temperature stability	
				84mV	0.703%

24V

1. Line regulation and Load regulation

Condition Tbp : 25°C

Io \ Vin	200VDC	210VDC	280VDC	425VDC	Line regulation	
0%	23.971V	23.971V	23.970V	23.971V	1mV	0.002%
50%	23.977V	23.977V	23.977V	23.977V	1mV	0.002%
100%	23.982V	23.983V	23.983V	23.984V	2mV	0.009%
Load regulation	11mV	12mV	13mV	13mV		
	0.046%	0.052%	0.055%	0.055%		

2. Temperature drift

Conditions Vin : 280VDC

Io : 100%

Tbp	-40°C	+25°C	+100°C	Temperature stability	
				115mV	0.480%

28V

1. Line regulation and Load regulation

Condition Tbp : 25°C

Io \ Vin	200VDC	210VDC	280VDC	425VDC	Line regulation	
0%	28.028V	28.028V	28.027V	28.027V	1mV	0.005%
50%	28.031V	28.031V	28.031V	28.031V	1mV	0.005%
100%	28.034V	28.036V	28.035V	28.036V	2mV	0.005%
Load regulation	6mV	8mV	8mV	8mV		
	0.021%	0.030%	0.030%	0.030%		

2. Temperature drift

Conditions Vin : 280VDC

Io : 100%

Tbp	-40°C	+25°C	+100°C	Temperature stability	
				159mV	0.568%

(1) 入力変動、負荷変動、温度変動 Line regulation, Load regulation, Temperature drift

36V

1. Line regulation and Load regulation

Condition Tbp : 25°C

Io \ Vin	200VDC	210VDC	280VDC	425VDC	Line regulation	
0%	36.078V	36.078V	36.077V	36.077V	1mV	0.002%
50%	36.082V	36.082V	36.082V	36.083V	1mV	0.002%
100%	36.085V	36.087V	36.087V	36.087V	2mV	0.006%
Load regulation	8mV	9mV	10mV	10mV		
	0.021%	0.026%	0.028%	0.028%		

2. Temperature drift

Conditions Vin : 280VDC

Io : 100%

Tbp	-40°C	+25°C	+100°C	Temperature stability	
Vo	36.069V	36.087V	35.933V	154mV	0.429%

48V

1. Line regulation and Load regulation

Condition Tbp : 25°C

Io \ Vin	200VDC	210VDC	280VDC	425VDC	Line regulation	
0%	48.125V	48.126V	48.124V	48.124V	2mV	0.004%
50%	48.128V	48.129V	48.129V	48.129V	1mV	0.002%
100%	48.130V	48.134V	48.133V	48.133V	3mV	0.007%
Load regulation	5mV	8mV	9mV	9mV		
	0.010%	0.016%	0.018%	0.018%		

2. Temperature drift

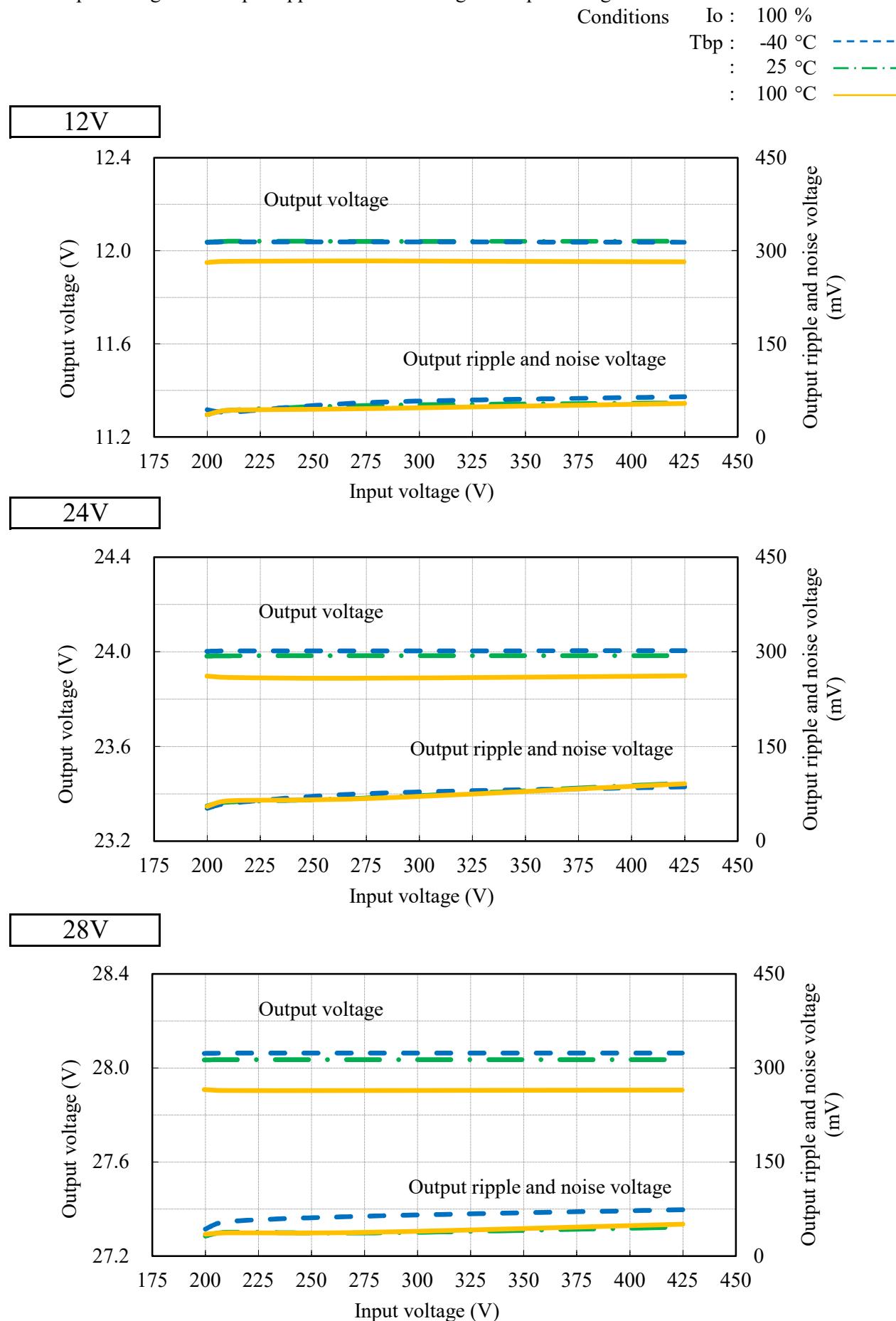
Conditions Vin : 280VDC

Io : 100%

Tbp	-40°C	+25°C	+100°C	Temperature stability	
Vo	48.115V	48.133V	47.915V	218mV	0.455%

(2) 出力電圧、出力リップル・ノイズ電圧 対 入力電圧

Output voltage and Output ripple and noise voltage vs. Input voltage

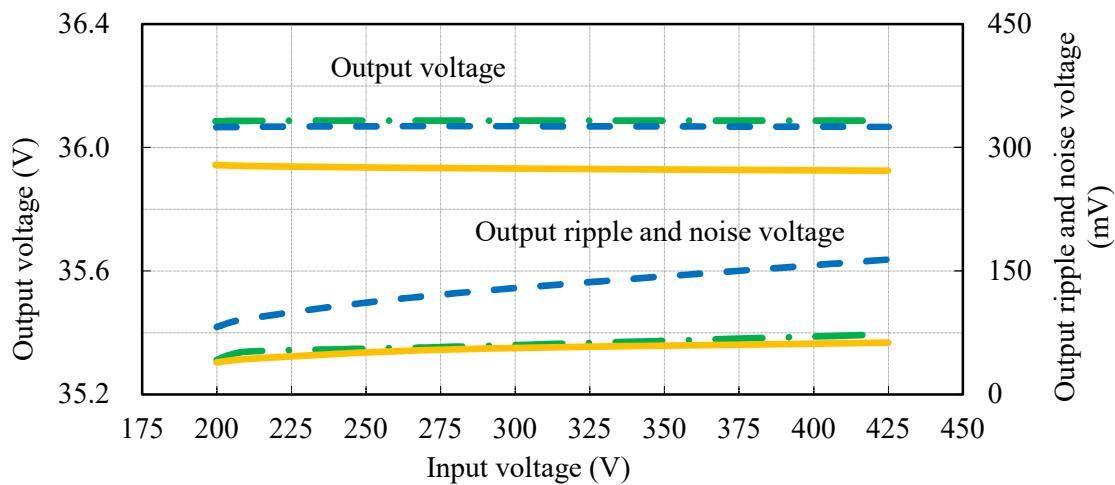


(2) 出力電圧、出力リップル・ノイズ電圧 対 入力電圧

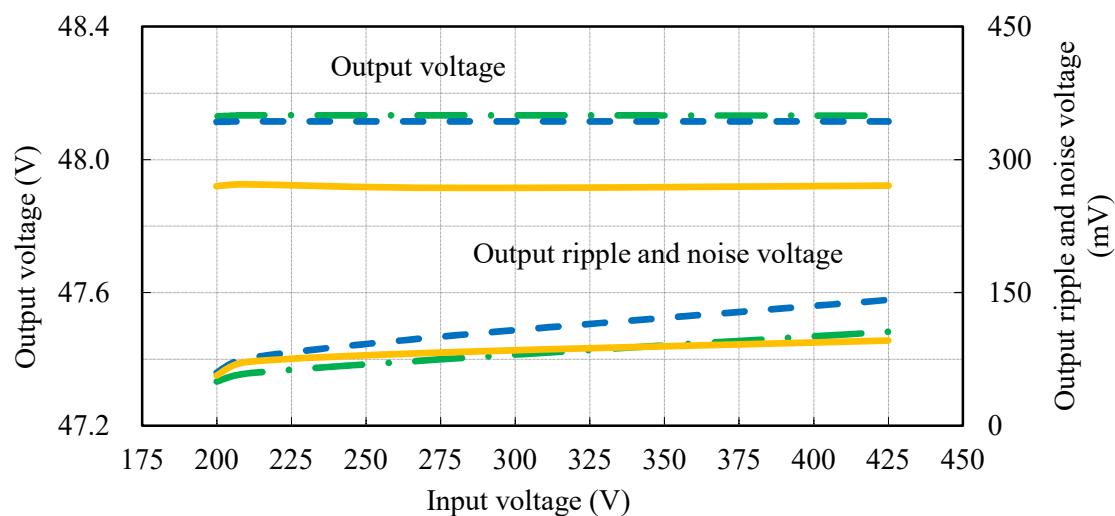
Output voltage and Output ripple and noise voltage vs. Input voltage

Conditions
 Io : 100 %
 Tbp : -40 °C
 : 25 °C
 : 100 °C

36V



48V

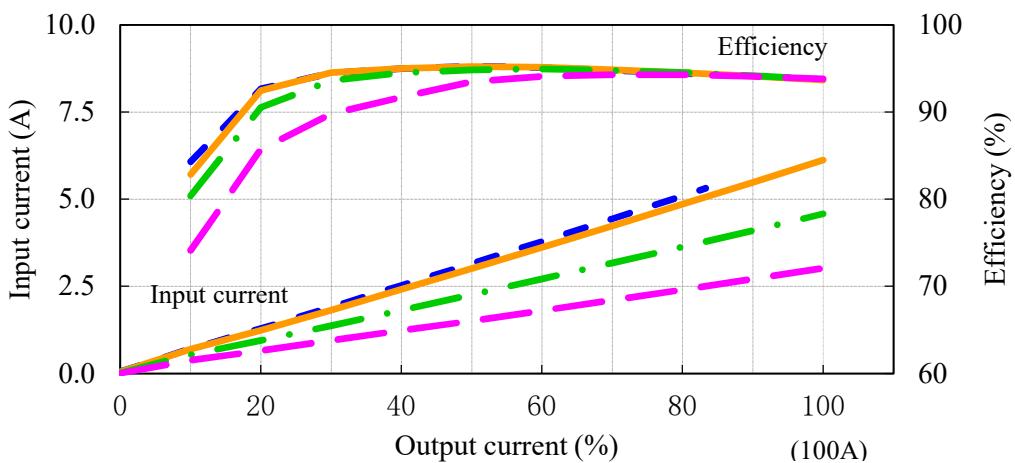


(3) 入力電流、効率 対 出力電流

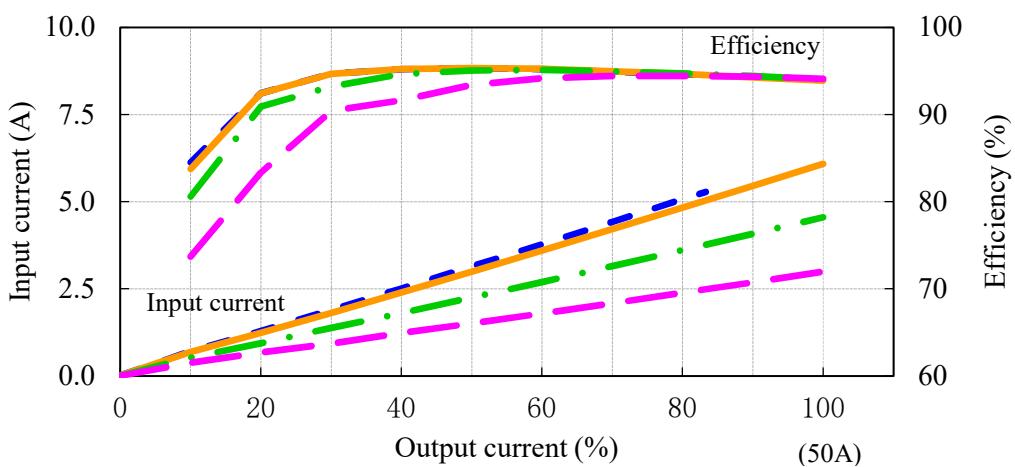
Input current and Efficiency vs. Output current

Conditions
 Vin : 200 VDC
 : 210 VDC
 : 280 VDC
 : 425 VDC
 Tbp : 25 °C

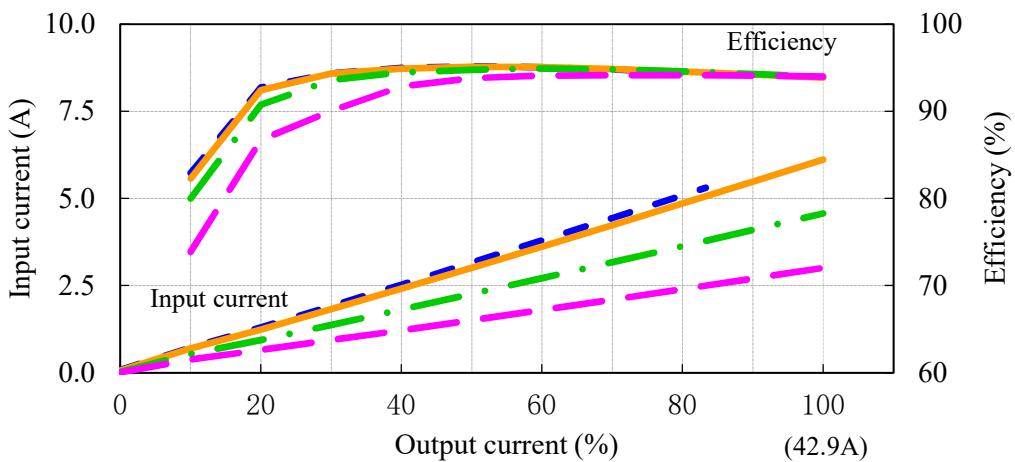
12V



24V



28V

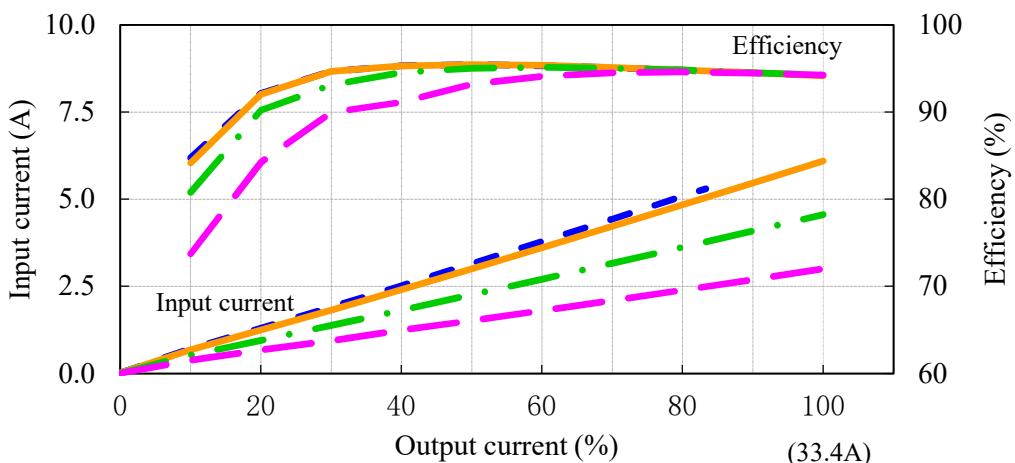


(3) 入力電流、効率 対 出力電流

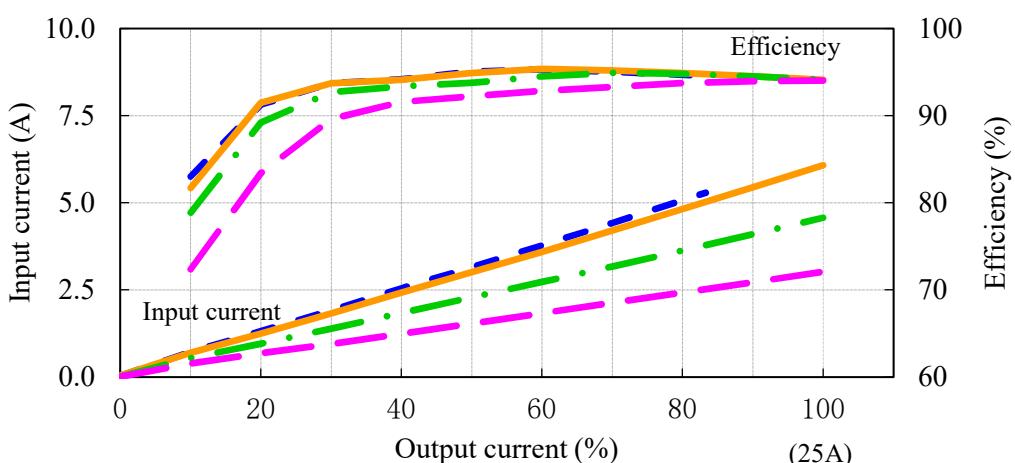
Input current and Efficiency vs. Output current

Conditions Vin : 200 VDC ---
 : 210 VDC —
 : 280 VDC ·—·
 : 425 VDC -·-
 Tbp : 25 °C

36V



48V

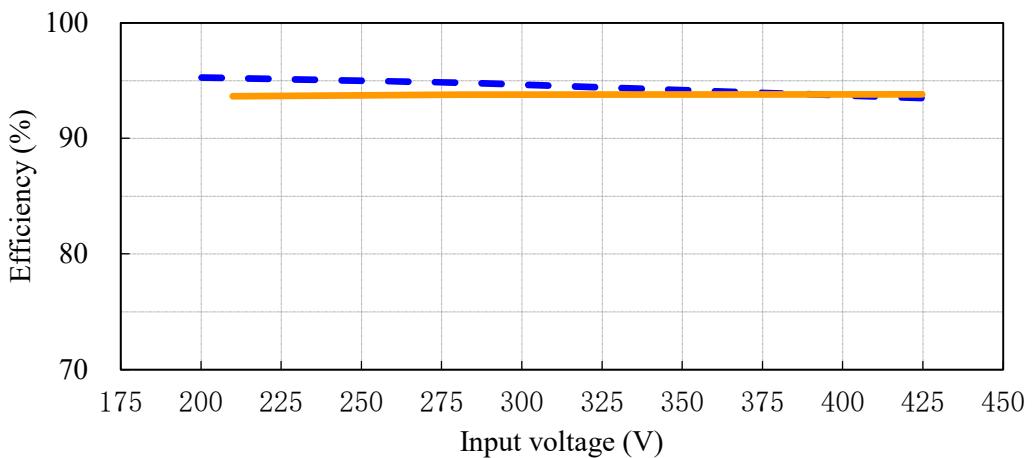


(4) 効率 対 入力電圧

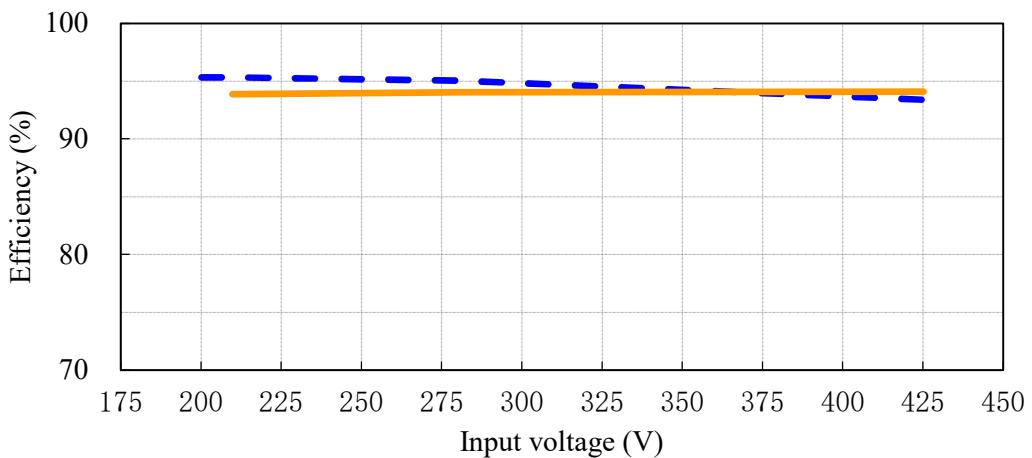
Efficiency vs. Input voltage

Conditions
Io : 50 %
: 100 %
Tbp : 25 °C

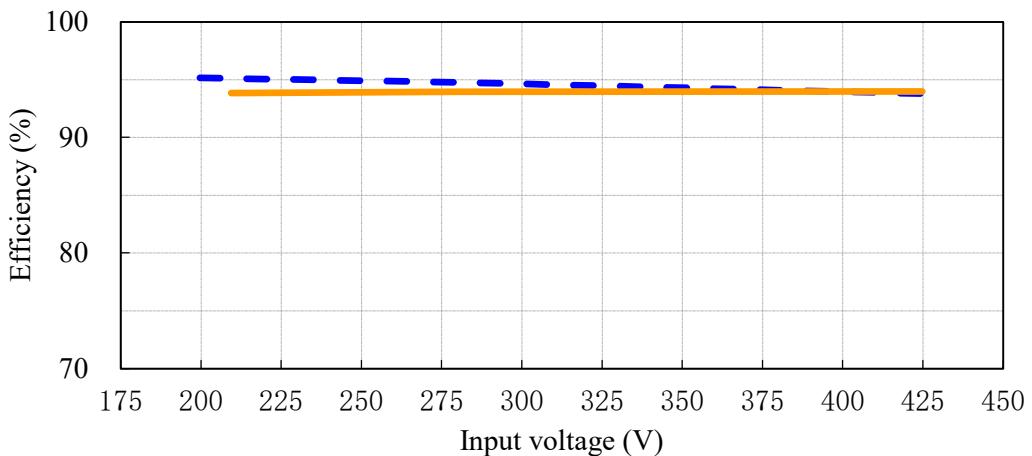
12V



24V



28V

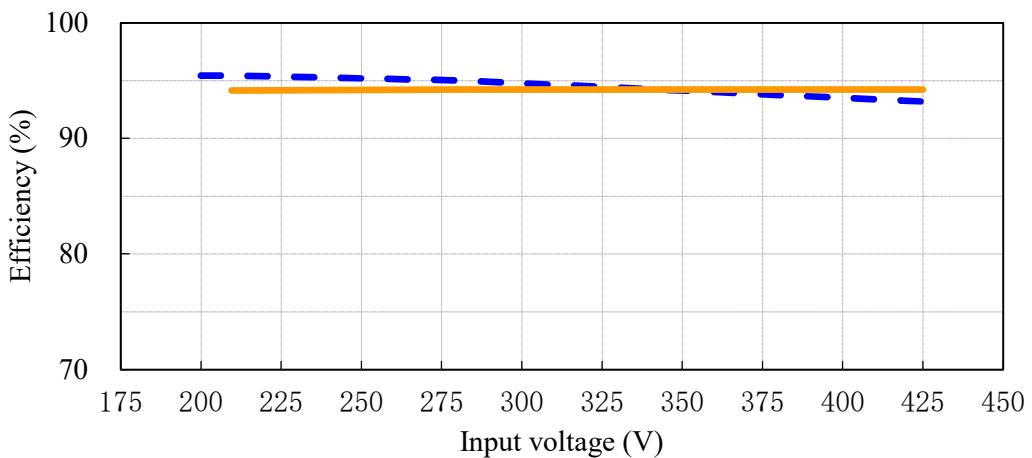


(4) 効率 対 入力電圧

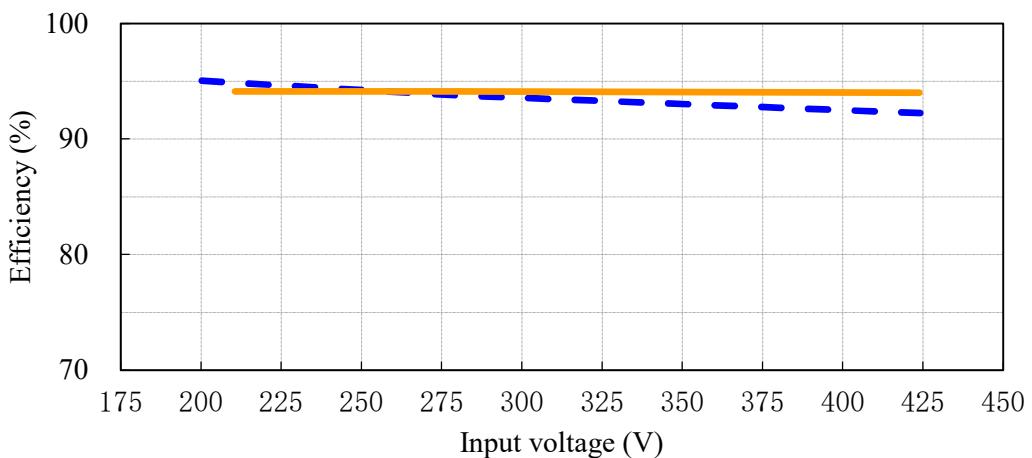
Efficiency vs. Input voltage

Conditions
Io : 50 %
: 100 %
Tbp : 25 °C

36V



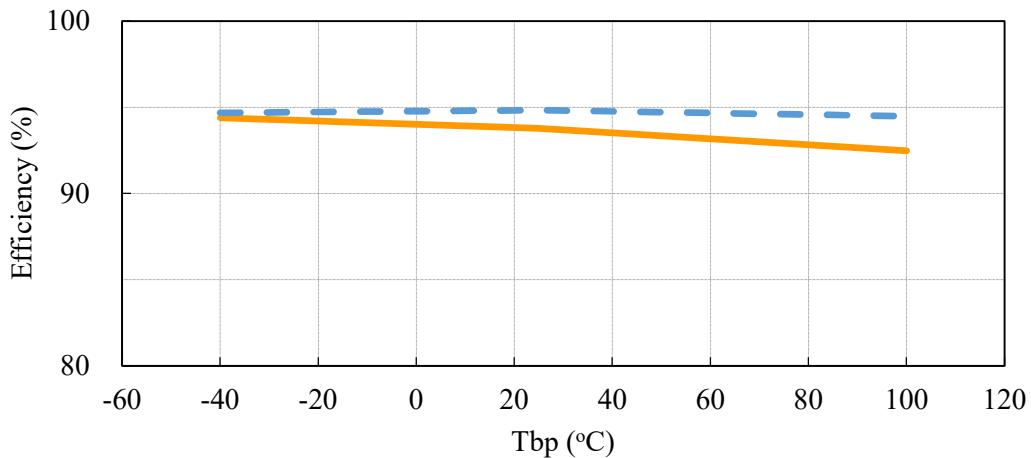
48V



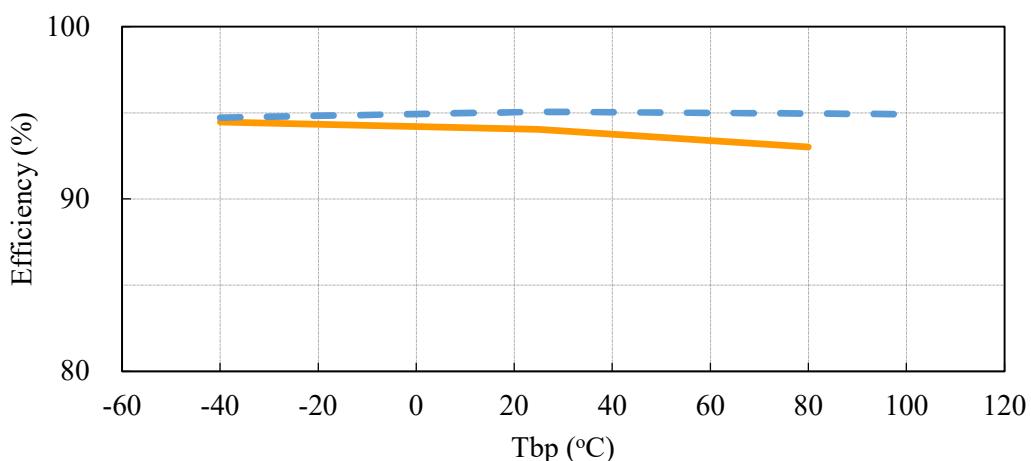
(5) 効率 対 ベースプレート温度
Efficiency vs. Baseplate temperature

Conditions Vin : 280 VDC
 Io : 50 % -----
 : 100 % ———

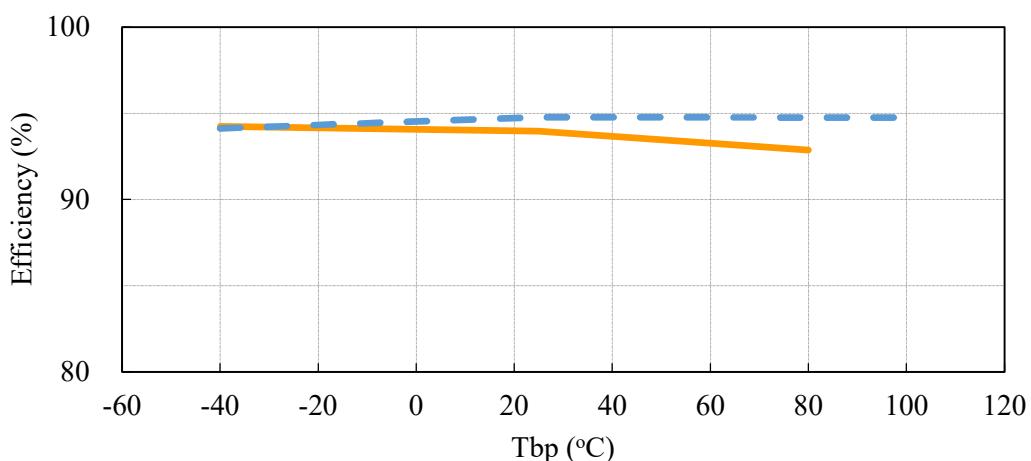
12V



24V



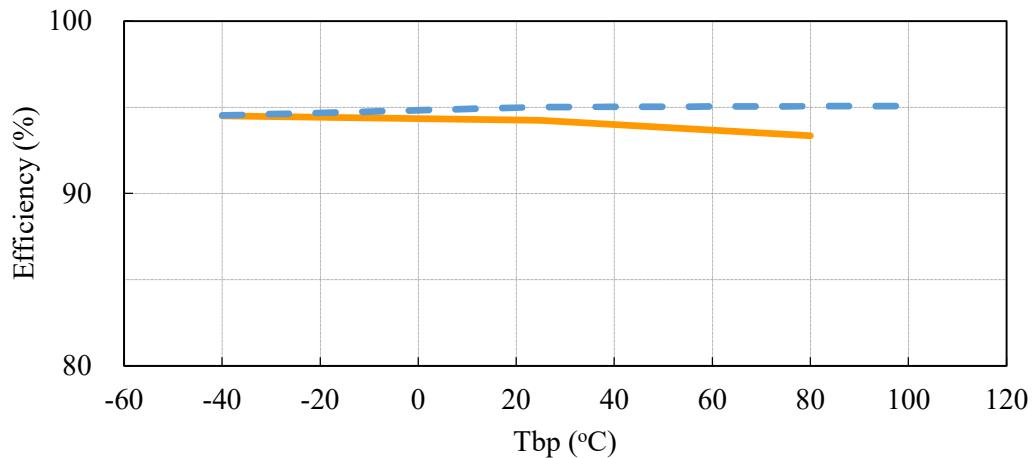
28V



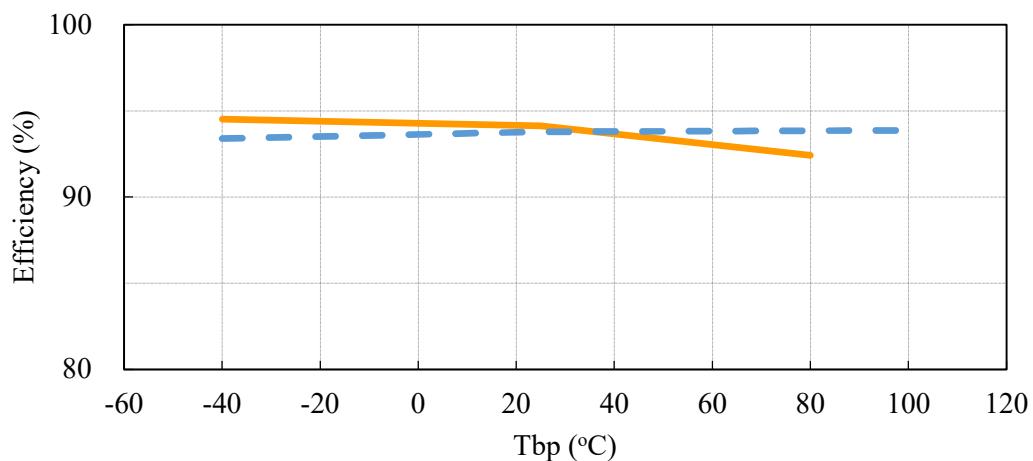
(5) 効率 対 ベースプレート温度
Efficiency vs. Baseplate temperature

Conditions Vin : 280 VDC
 Io : 50 % -----
 : 100 % ———

36V



48V



(6) 起動、停止電圧特性

Start and Stop voltage characteristics

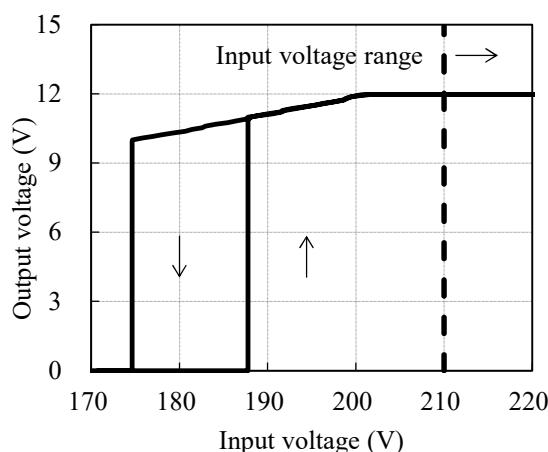
出力電圧 対 入力電圧

Output voltage vs. Input voltage

Conditions Io : 100 %

Tbp : 25 °C

12V



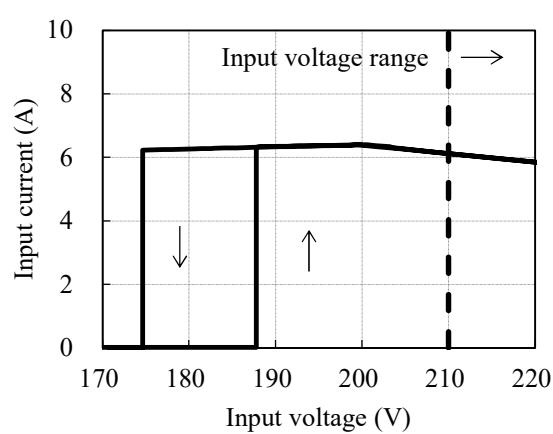
入力電流 対 入力電圧

Input current vs. Input voltage

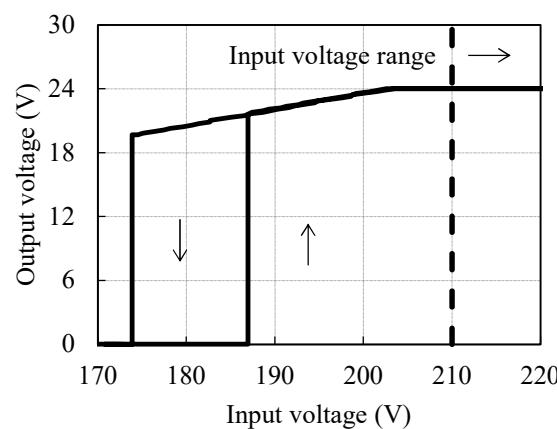
Conditions Io : 100 %

Tbp : 25 °C

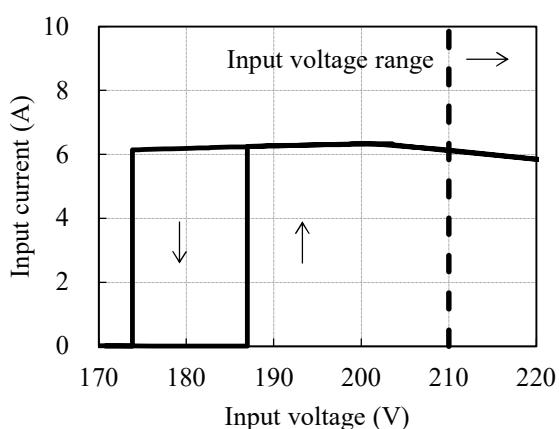
12V



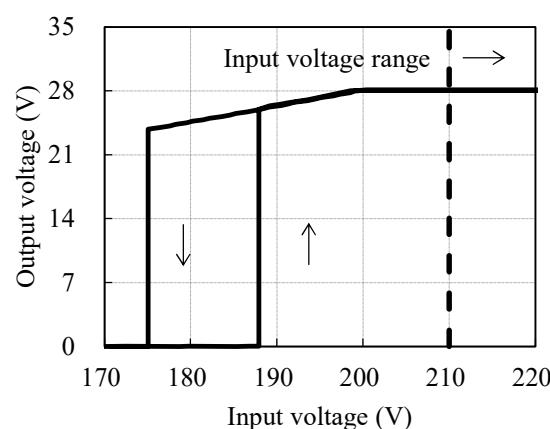
24V



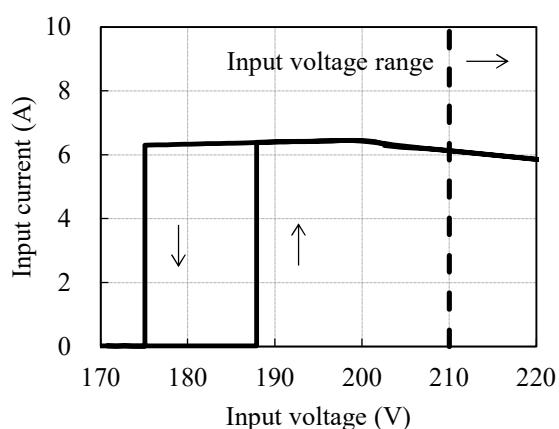
24V



28V



28V



(6) 起動、停止電圧特性

Start and Stop voltage characteristics

出力電圧 対 入力電圧

Output voltage vs. Input voltage

Conditions Io : 100 %

Tbp : 25 °C

入力電流 対 入力電圧

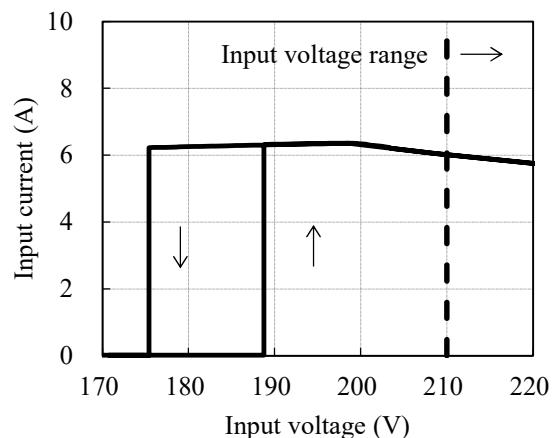
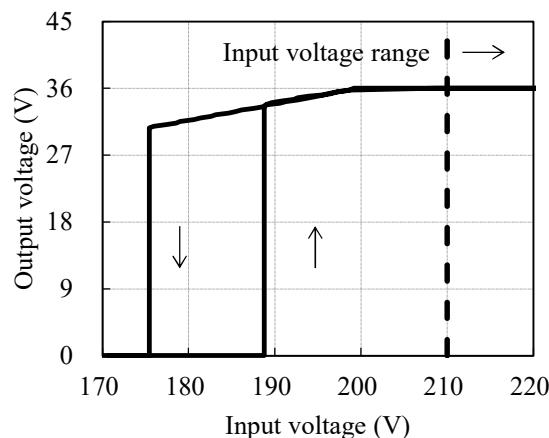
Input current vs. Input voltage

Conditions Io : 100 %

Tbp : 25 °C

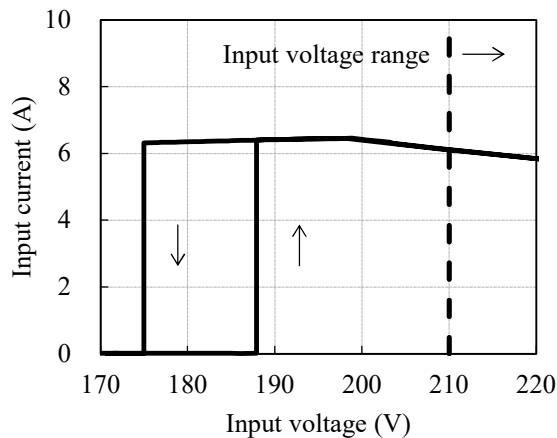
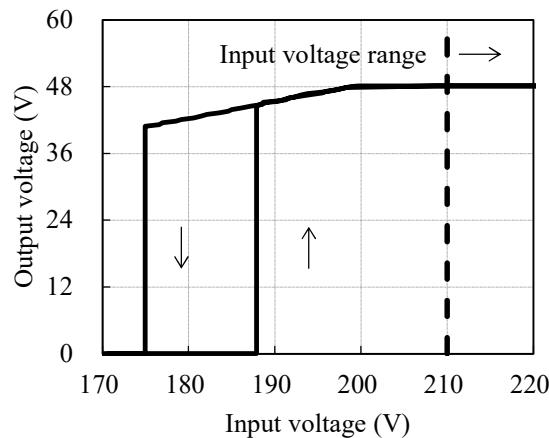
36V

36V



48V

48V



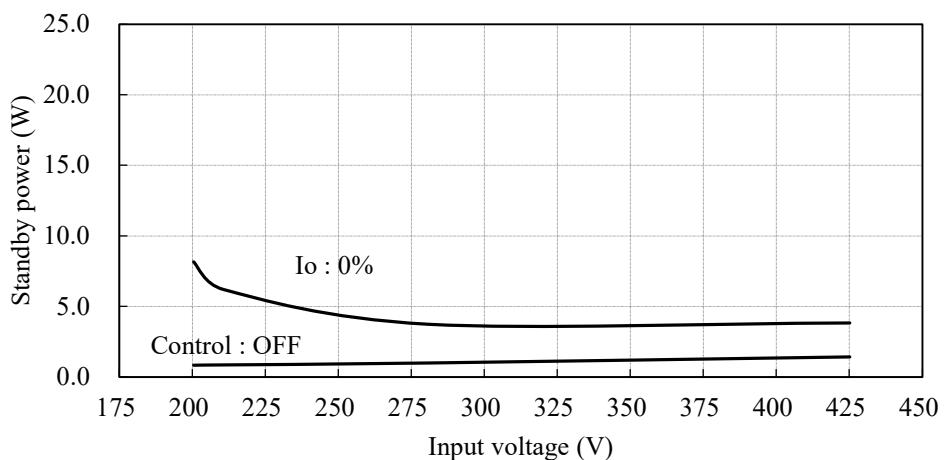
2.2 待機電力特性

Standby power characteristics

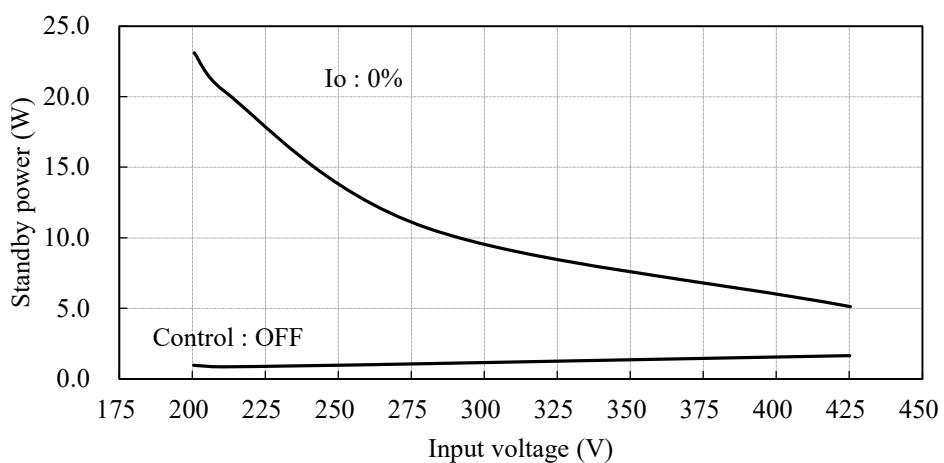
Condition

Tbp: 25°C

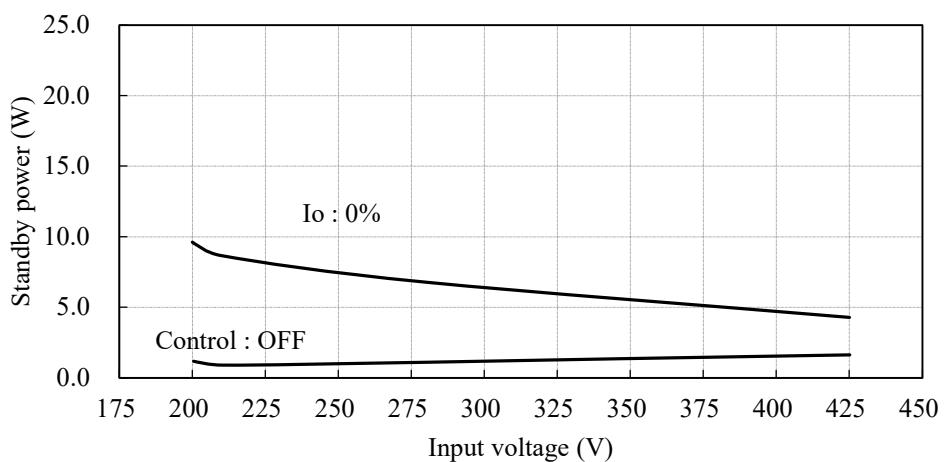
12V



24V



28V



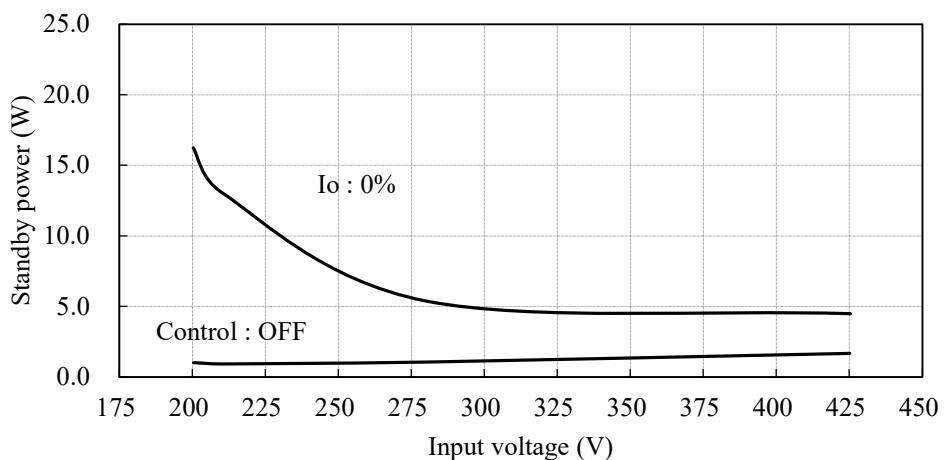
2.2 待機電力特性

Standby power characteristics

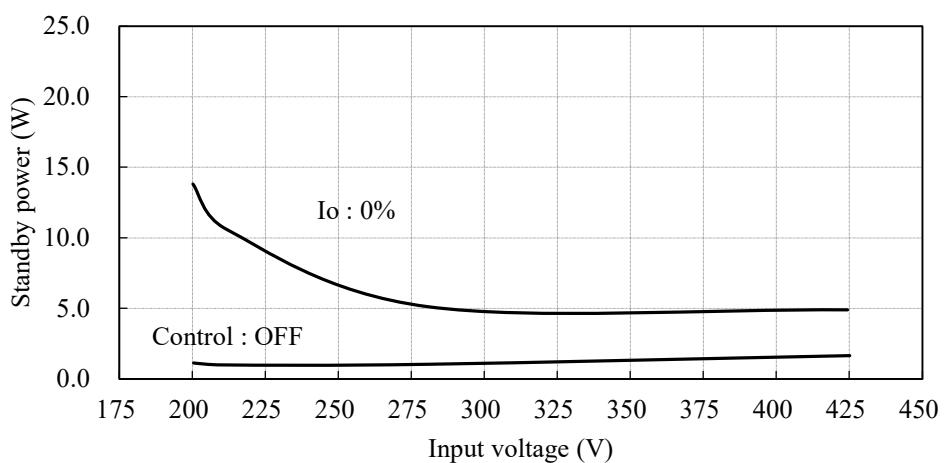
Condition

Tbp: 25°C

36V



48V



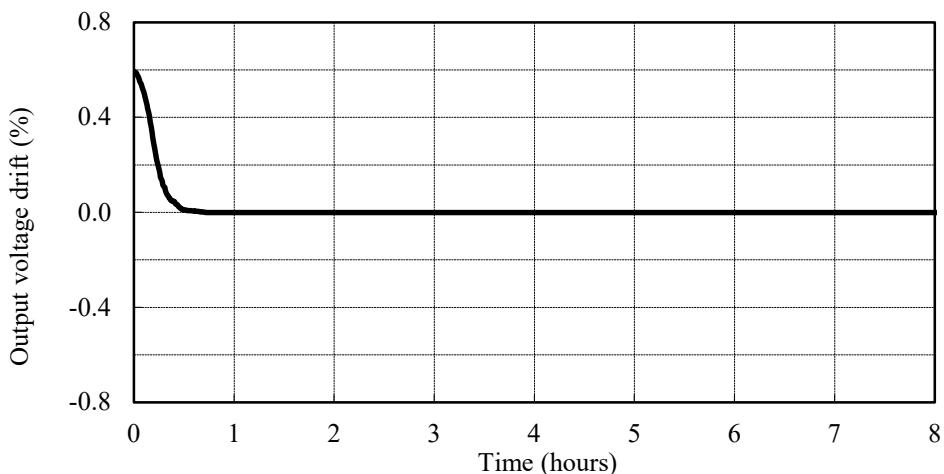
2.3 通電ドリフト特性

Warm up voltage drift characteristics

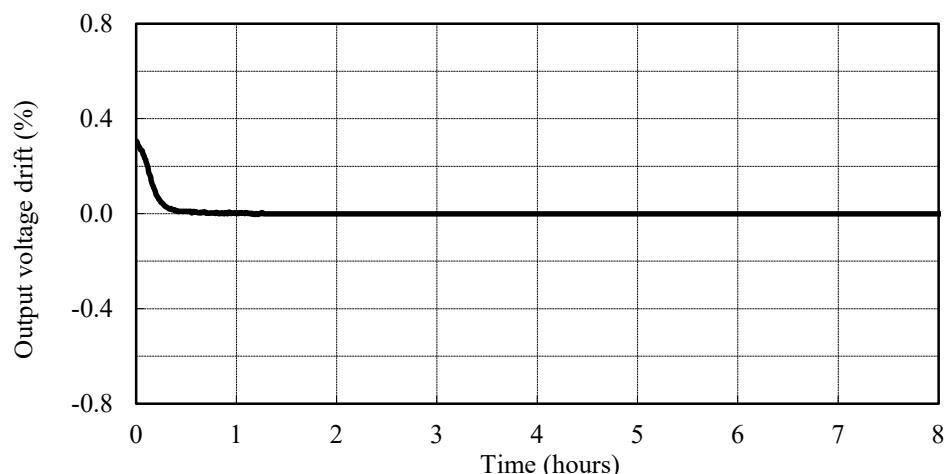
Conditions

Vin : 280VDC
Io : 100%
Ta : 25°C

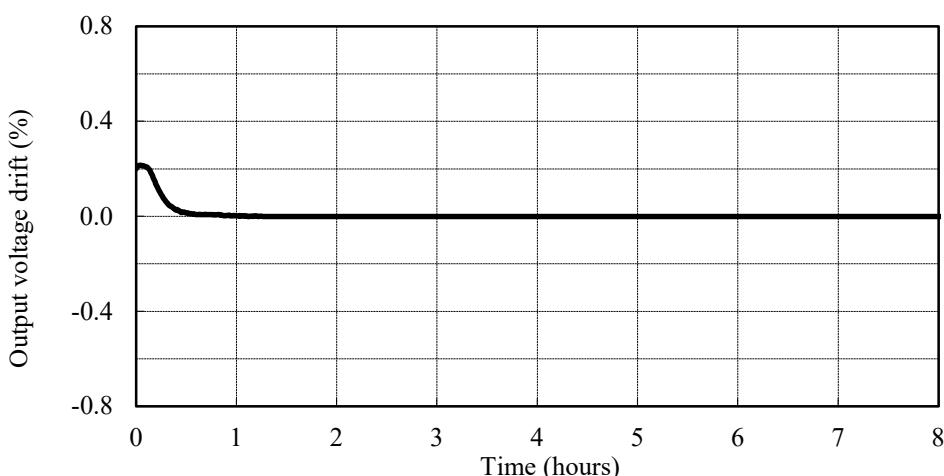
12V



24V



28V



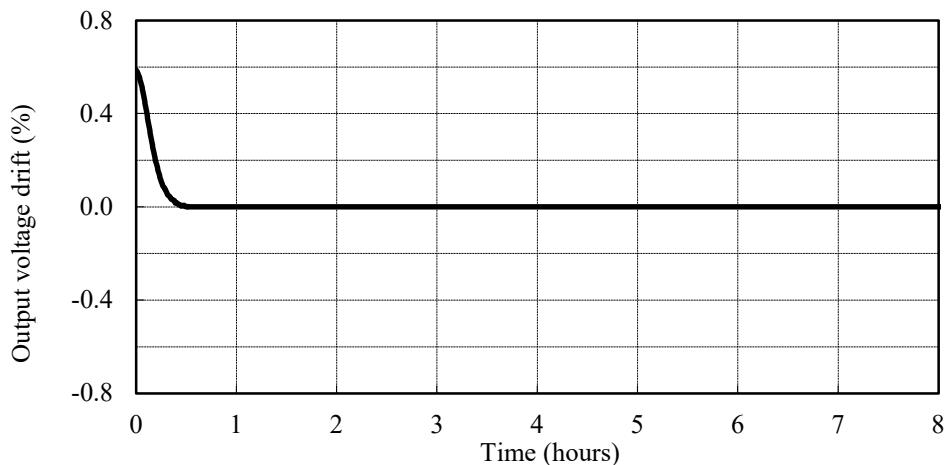
2.3 通電ドリフト特性

Warm up voltage drift characteristics

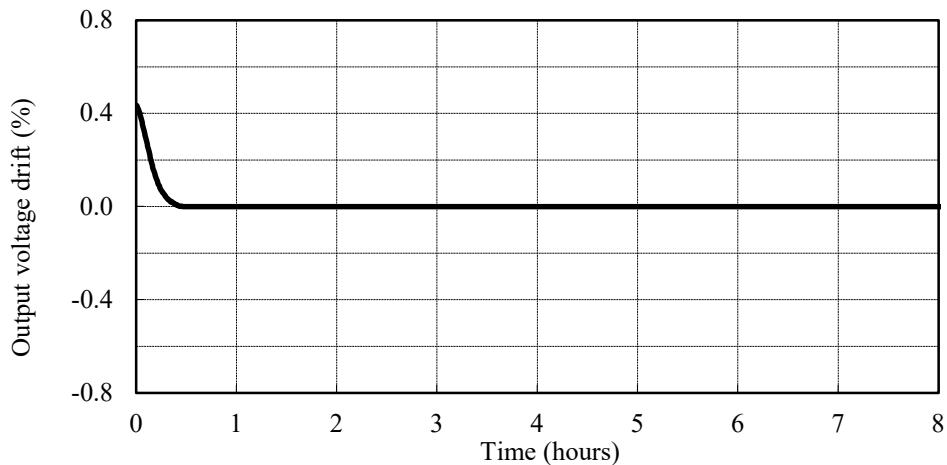
Conditions

Vin : 280VDC
Io : 100%
Ta : 25°C

36V



48V



2.4 過電流保護特性

Over current protection (OCP) characteristics

入力電圧依存性

Input voltage dependence

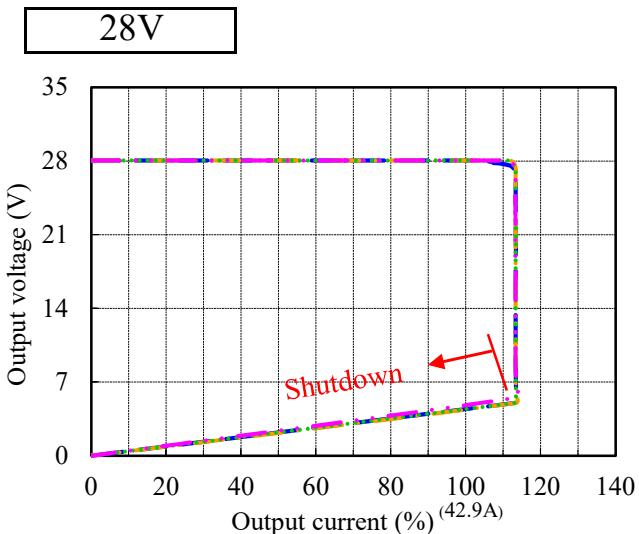
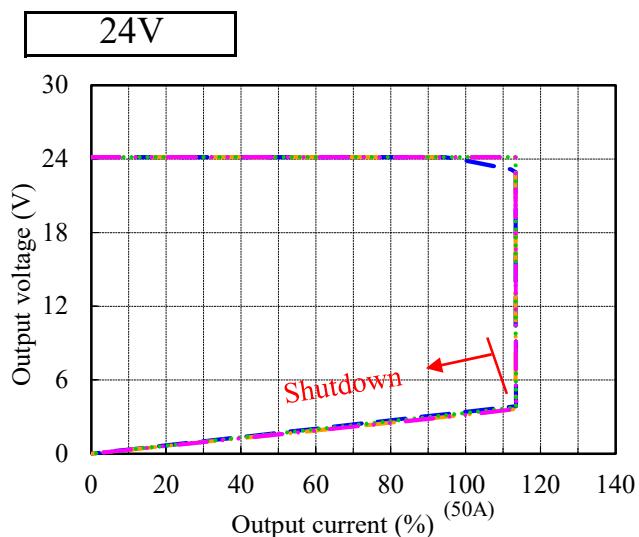
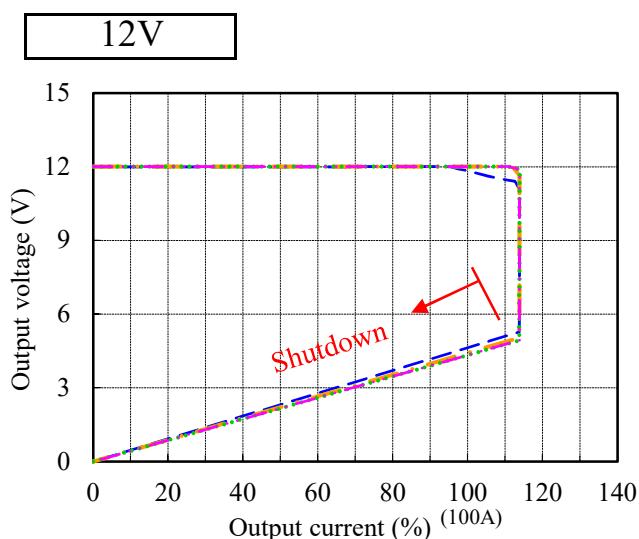
Conditions Vin : 200 VDC

: 210 VDC

: 280 VDC

: 425 VDC

Tbp : 25 °C



ベースプレート温度依存性

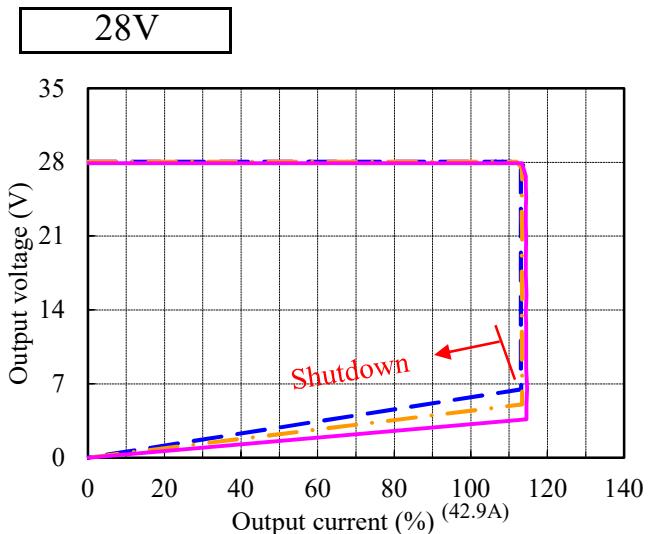
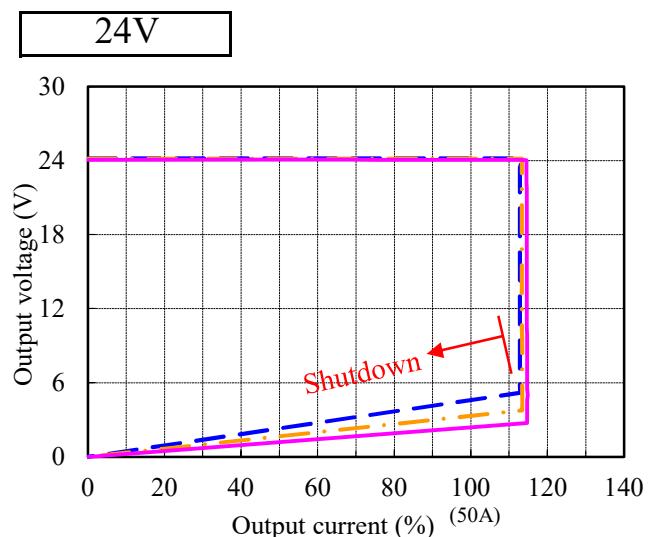
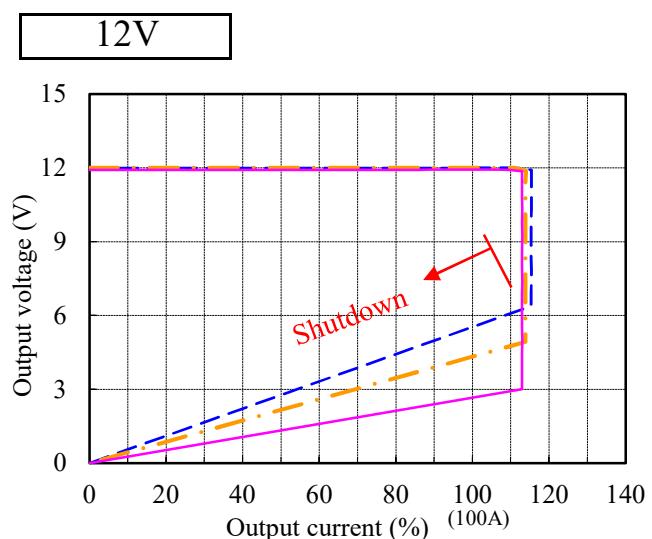
Baseplate temperature dependence

Conditions Vin : 280 VDC

Tbp : -40 °C

: 25 °C

: 100 °C



2.4 過電流保護特性

Over current protection (OCP) characteristics

入力電圧依存性

Input voltage dependence

Conditions Vin : 200 VDC

: 210 VDC

: 280 VDC

: 425 VDC

Tbp : 25 °C

ベースプレート温度依存性

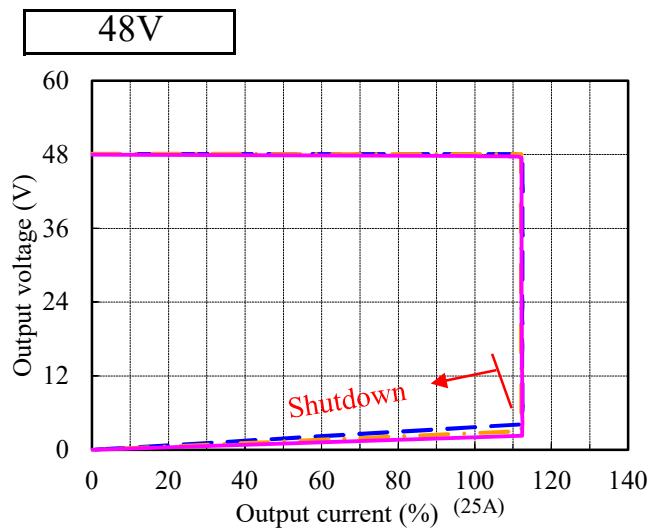
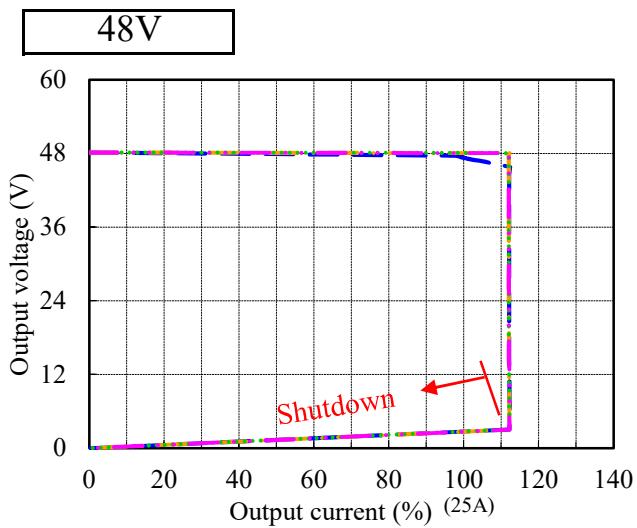
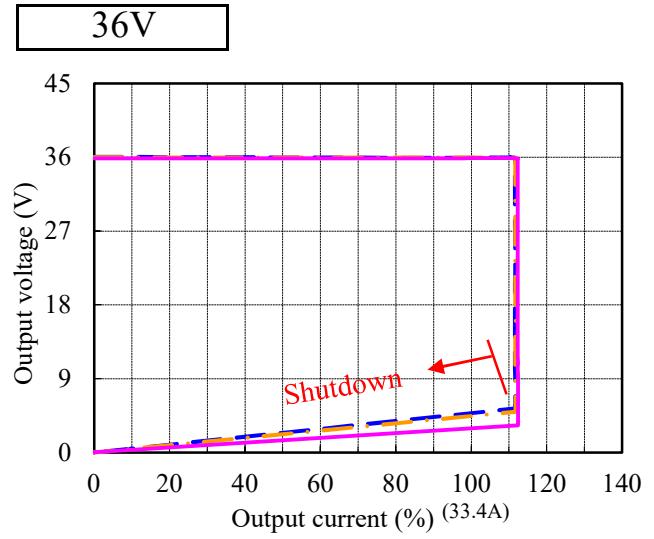
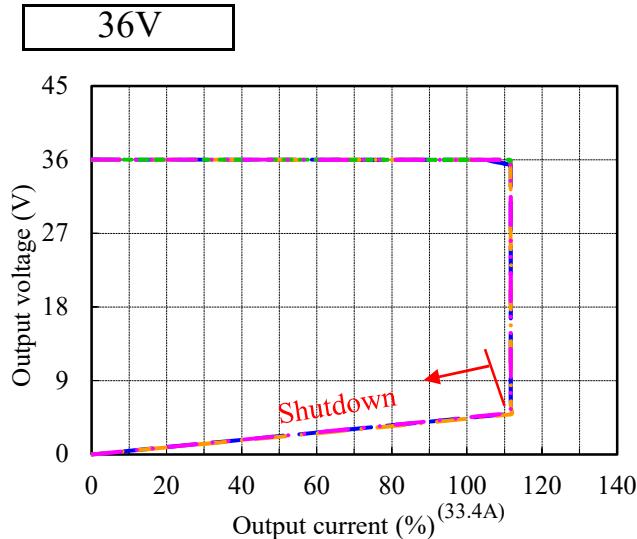
Baseplate temperature dependence

Conditions Vin : 280 VDC

Tbp : -40 °C

: 25 °C

: 100 °C

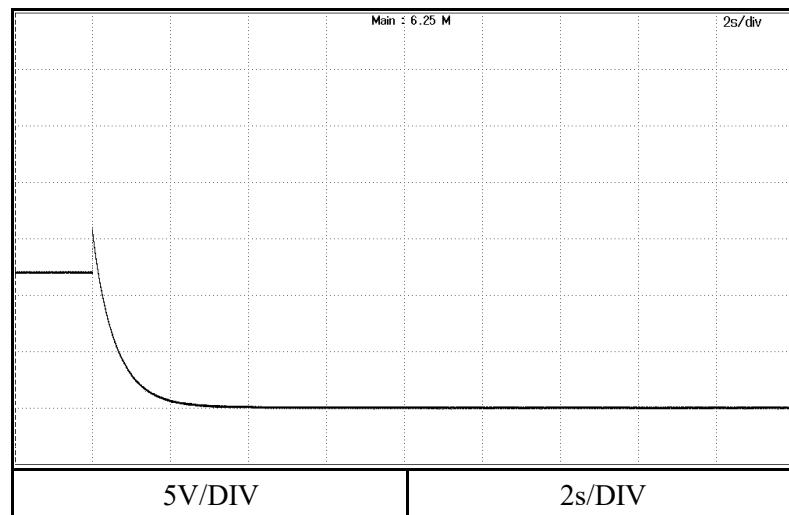


2.5 過電圧保護特性

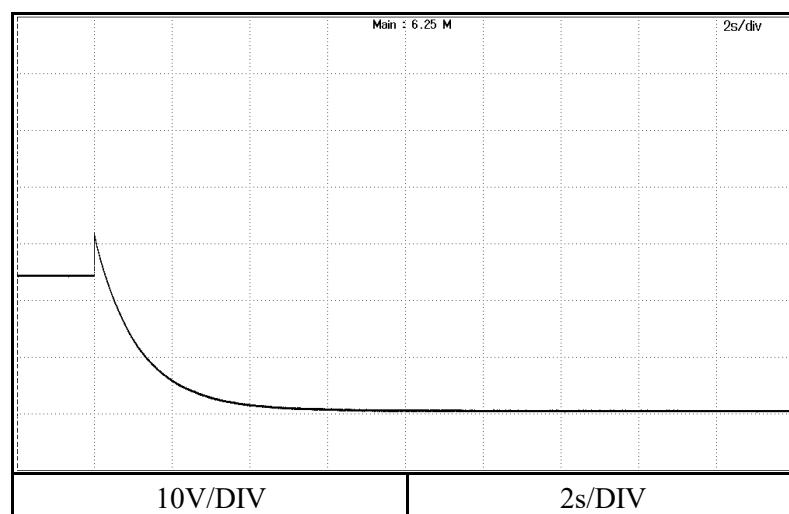
Over voltage protection (OVP) characteristics

Conditions Vin : 280VDC
 Io : 0%
 Tbp : 25°C

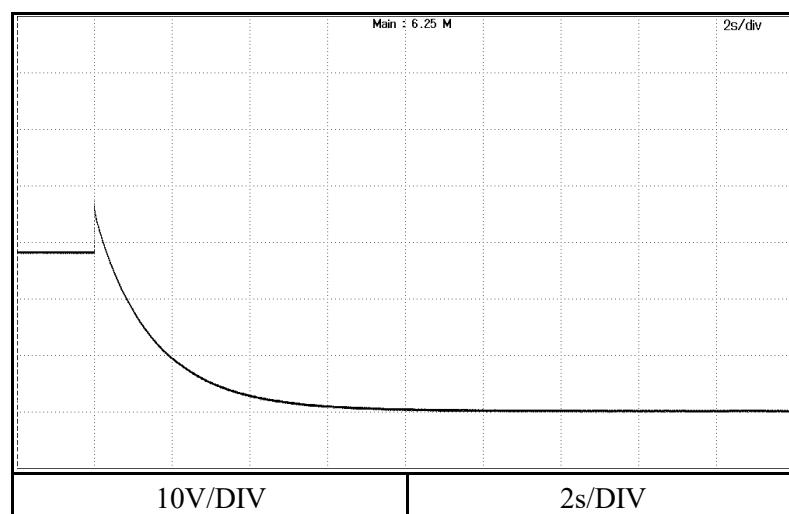
12V



24V



28V



2.5 過電圧保護特性

Over voltage protection (OVP) characteristics

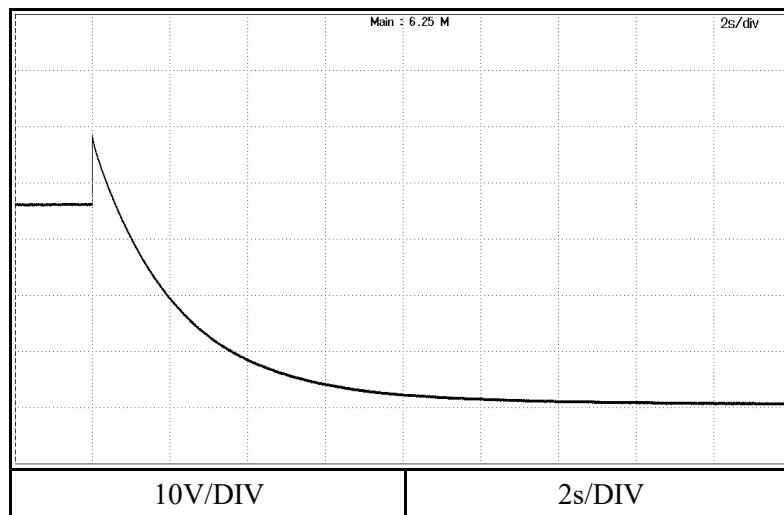
Conditions Vin : 280VDC
 Io : 0%
 Tbp : 25°C

36V

OVP point →

Vo →

GND →

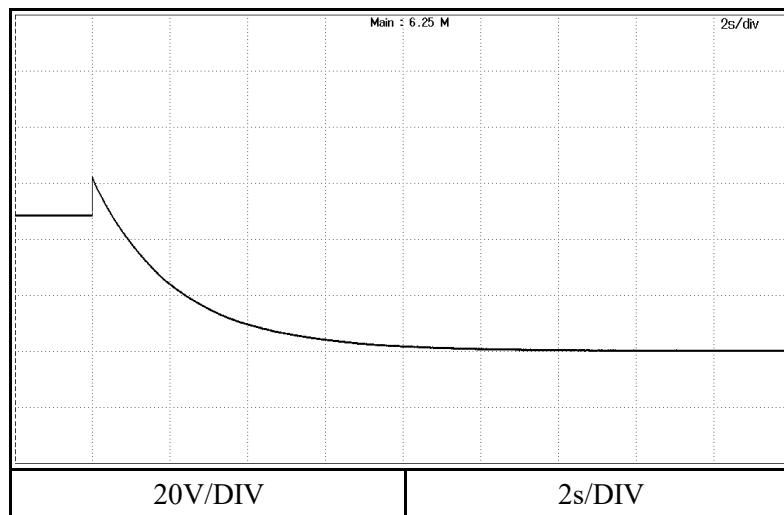


48V

OVP point →

Vo →

GND →

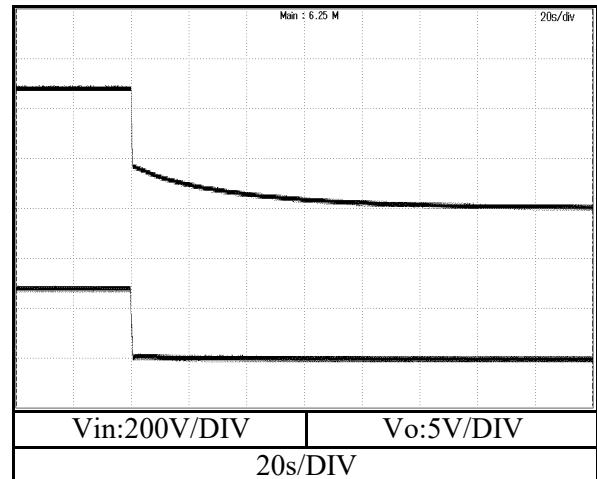
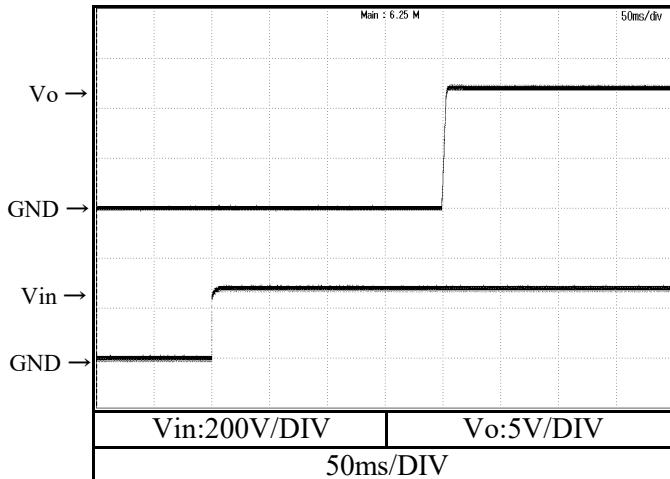


2.6 出力立ち上がり、立ち下がり特性
Output rise and fall characteristics

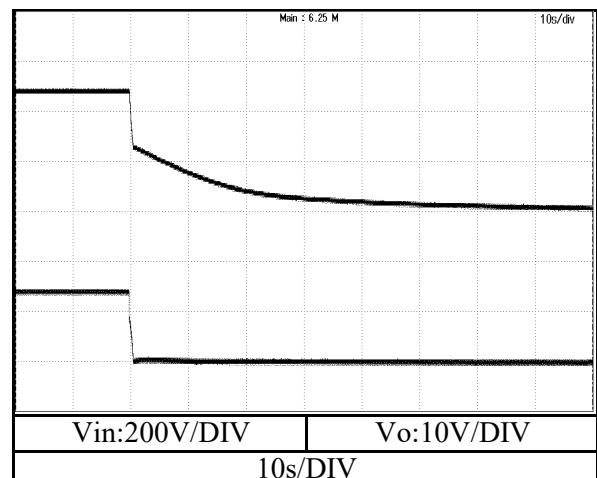
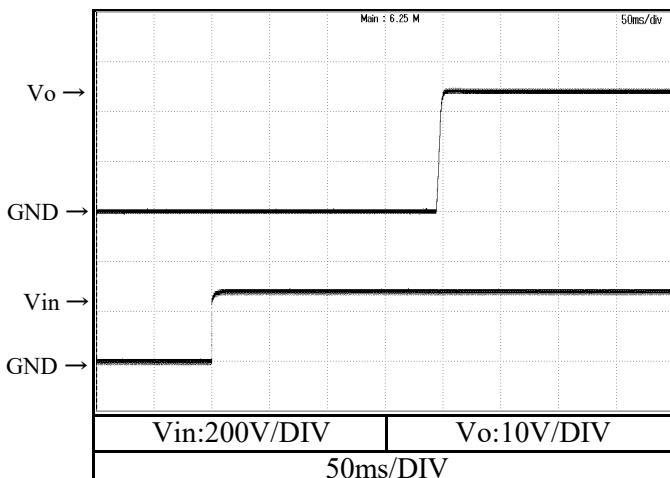
Conditions

Vin : 280VDC
Io : 0 %
Tbp : 25°C

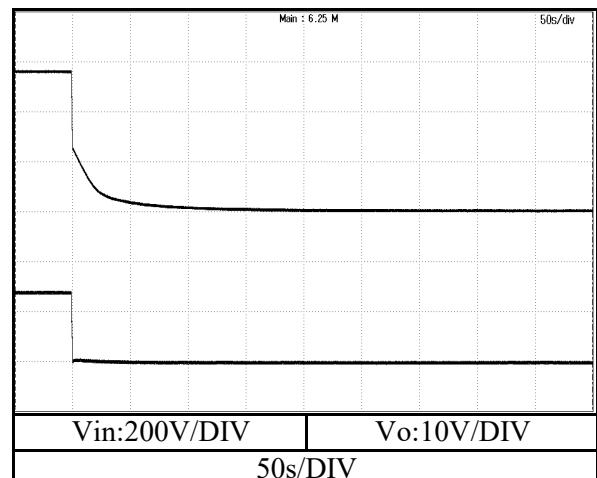
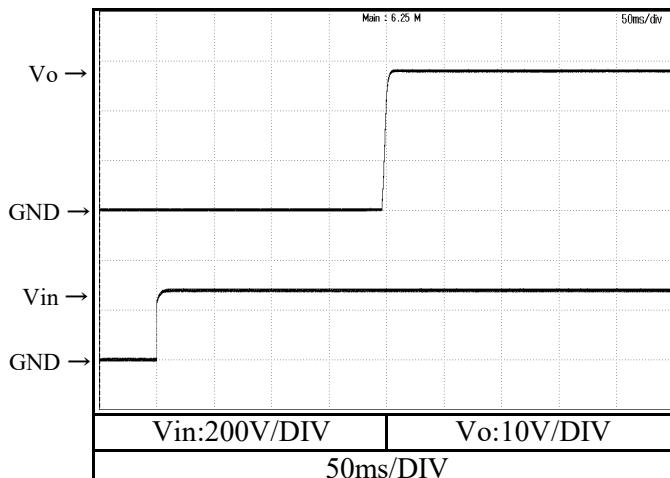
12V



24V



28V

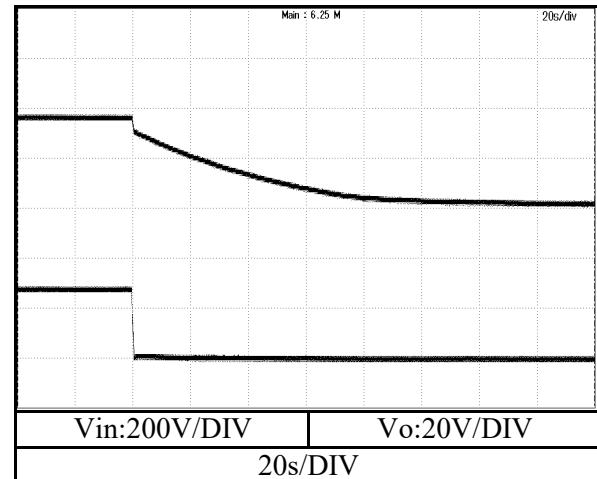
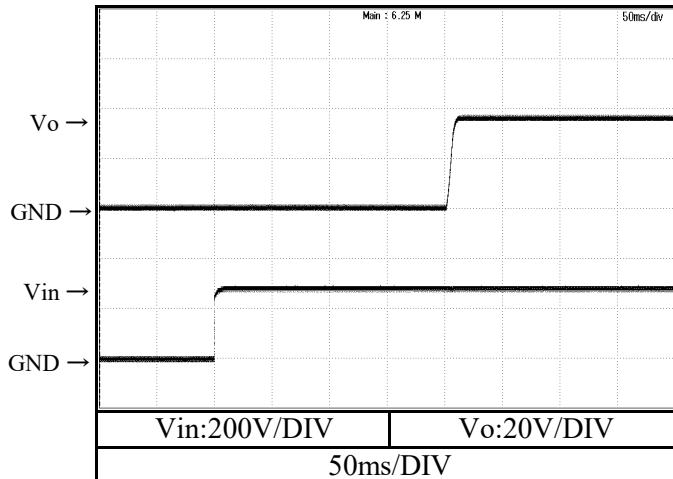


2.6 出力立ち上がり、立ち下がり特性
Output rise and fall characteristics

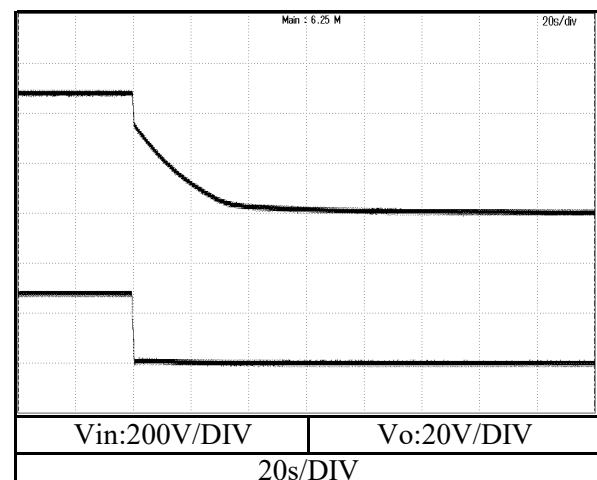
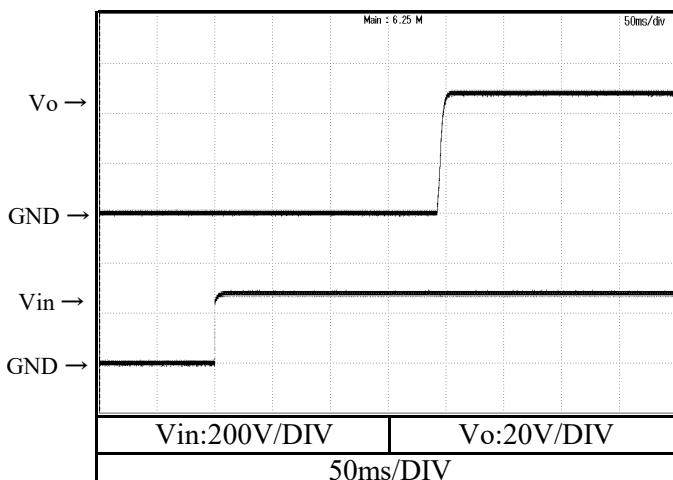
Conditions

Vin : 280VDC
Io : 0 %
Tbp : 25°C

36V



48V

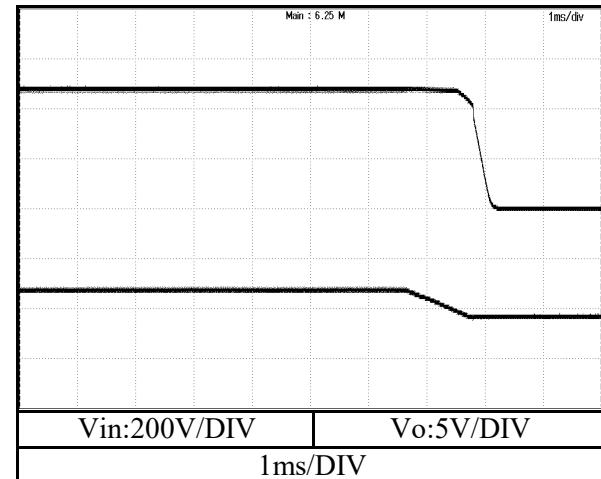
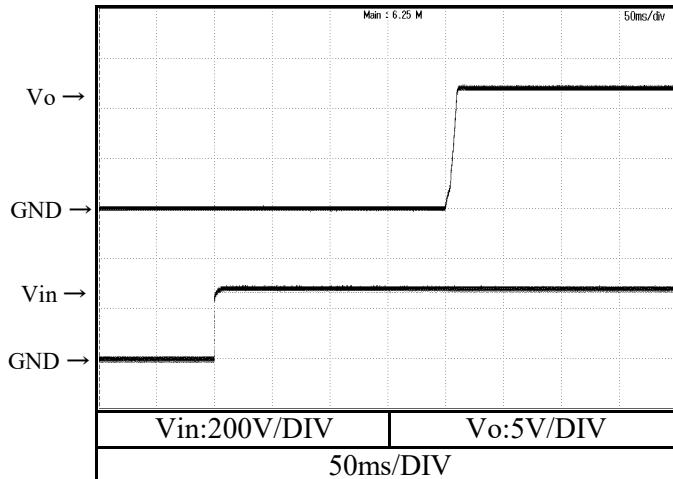


2.6 出力立ち上がり、立ち下がり特性
Output rise and fall characteristics

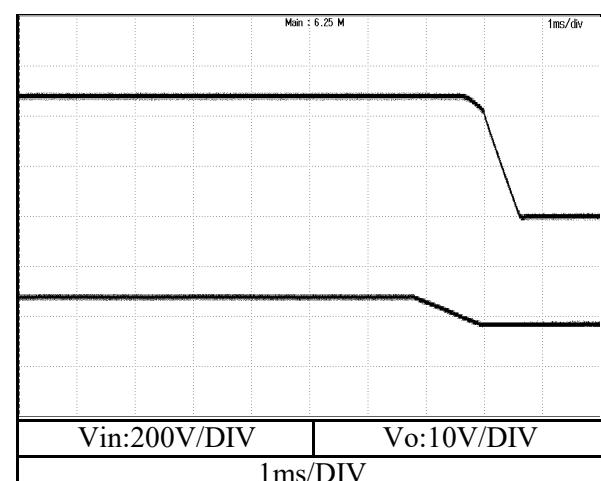
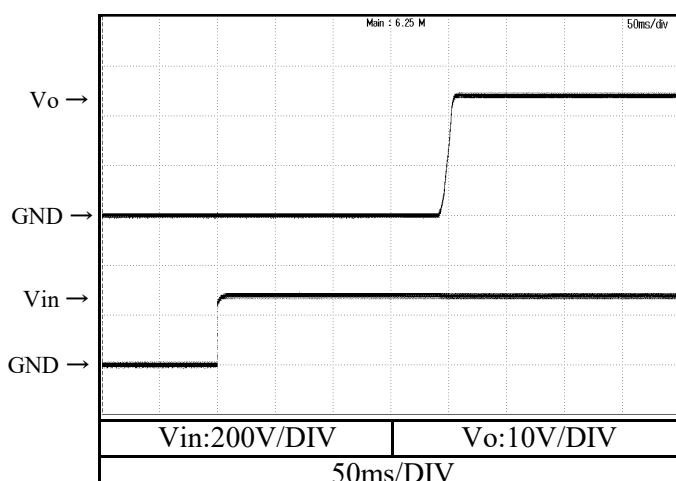
Conditions

Vin : 280VDC
Io : 100 %
Tbp : 25°C

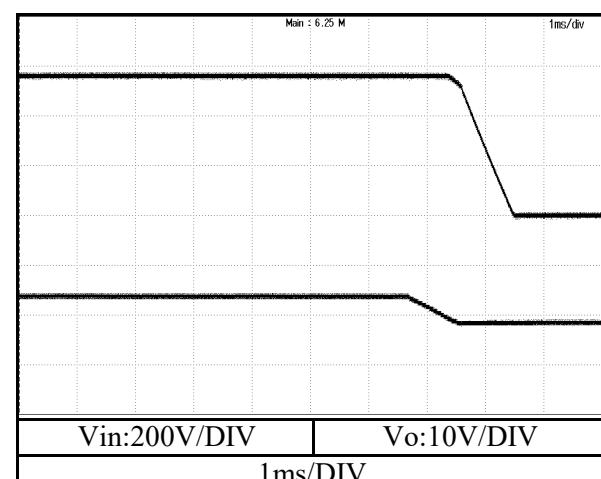
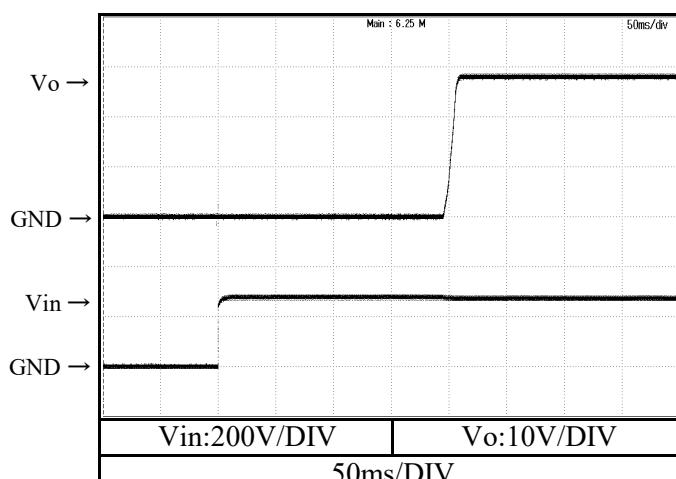
12V



24V



28V

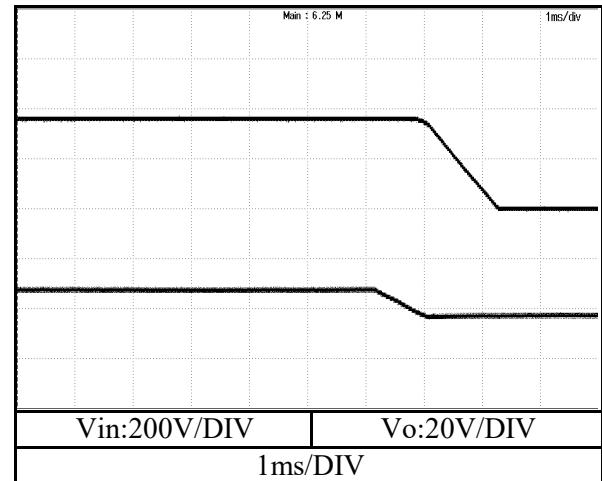
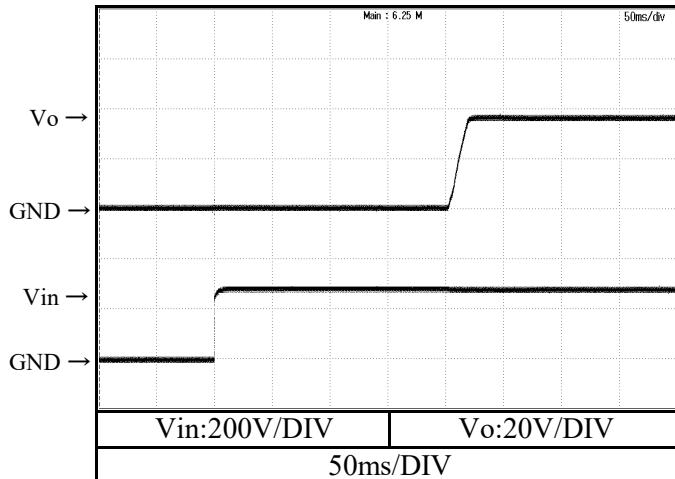


2.6 出力立ち上がり、立ち下がり特性
Output rise and fall characteristics

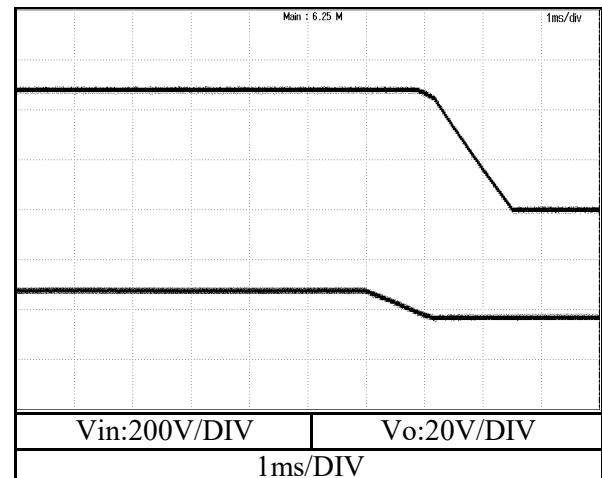
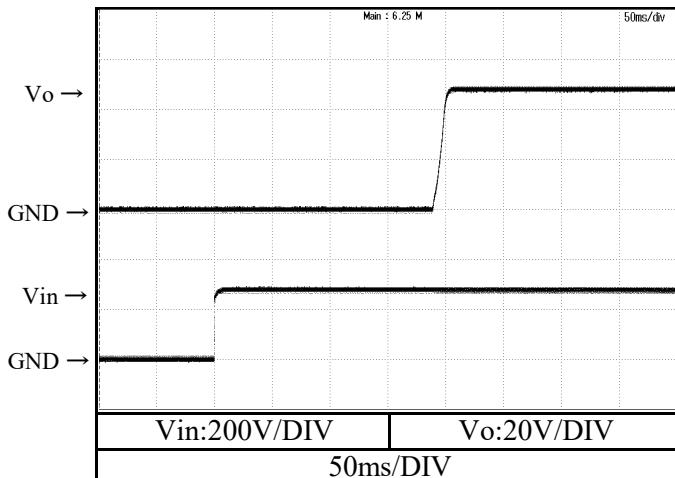
Conditions

Vin : 280VDC
Io : 100 %
Tbp : 25°C

36V



48V



2.6 出力立ち上がり、立ち下がり特性 (ON/OFFコントロール時)

Output rise and fall characteristics with ON/OFF CONTROL

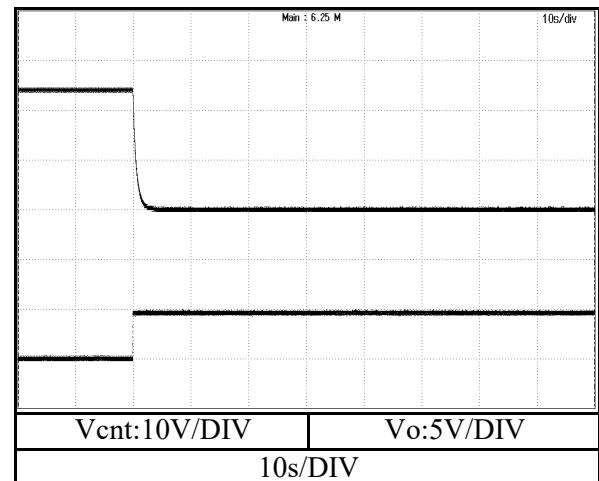
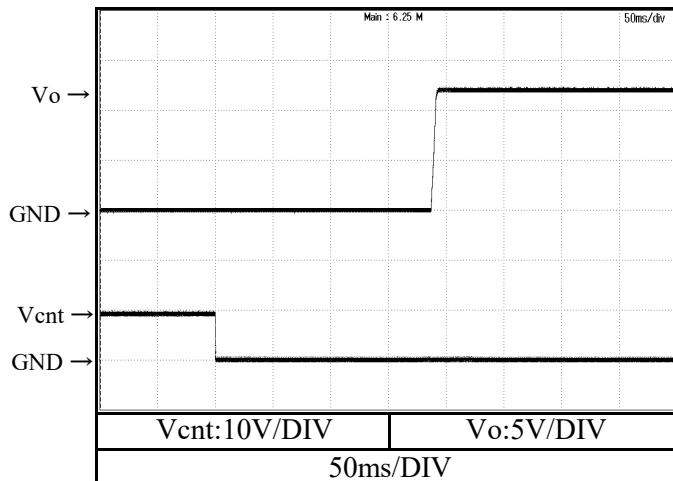
Conditions

Vin : 280VDC

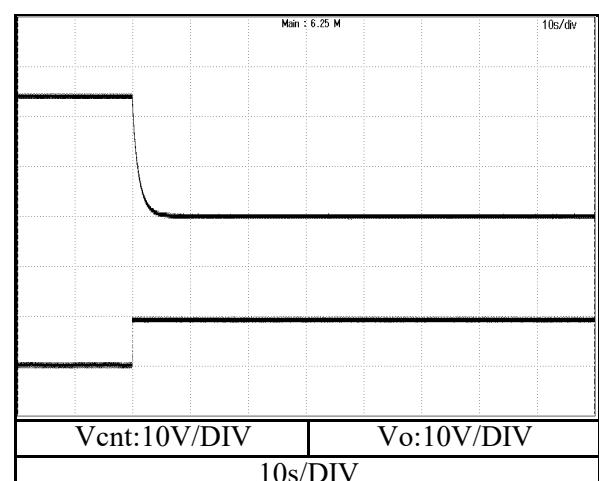
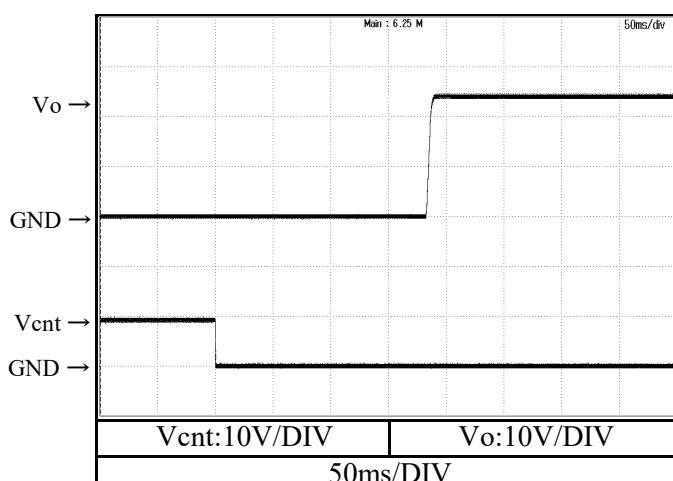
Io : 0 %

Tbp : 25°C

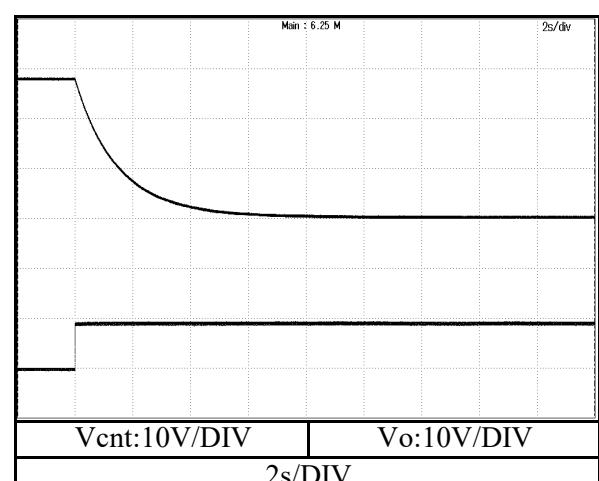
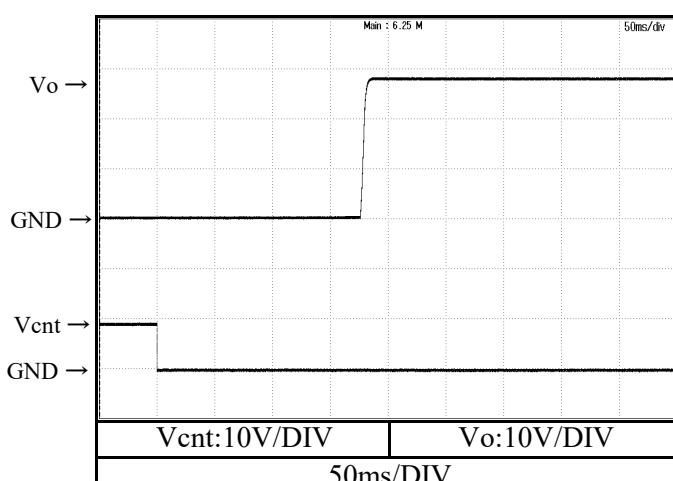
12V



24V



28V



2.6 出力立ち上がり、立ち下がり特性 (ON/OFFコントロール時)

Output rise and fall characteristics with ON/OFF CONTROL

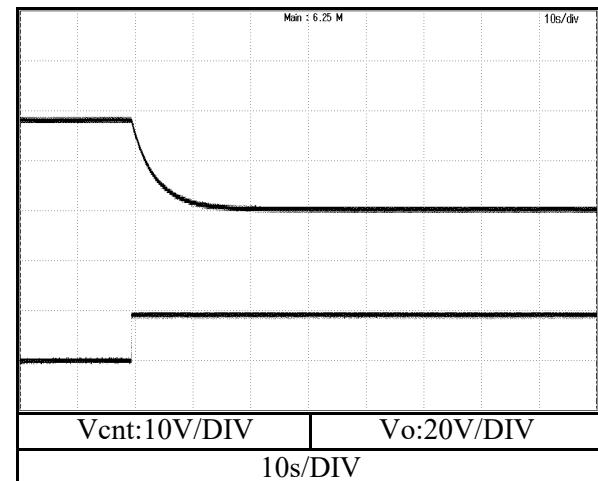
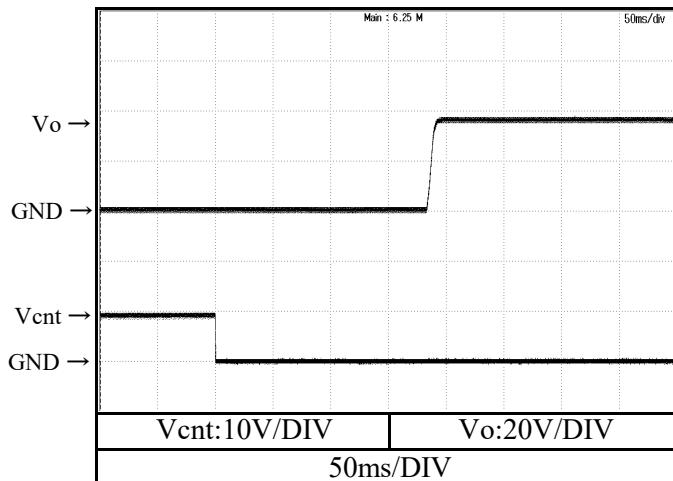
Conditions

Vin : 280VDC

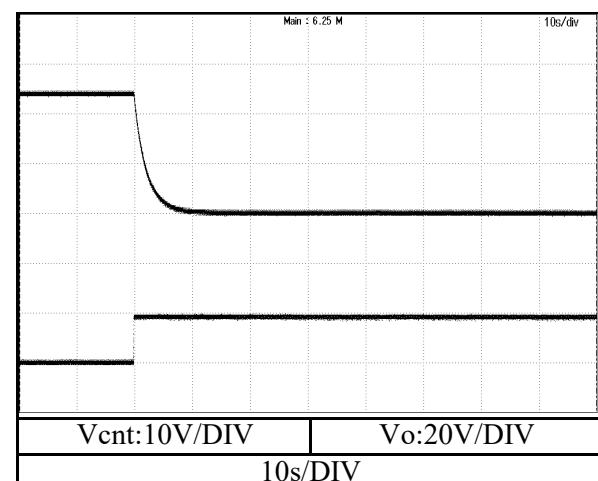
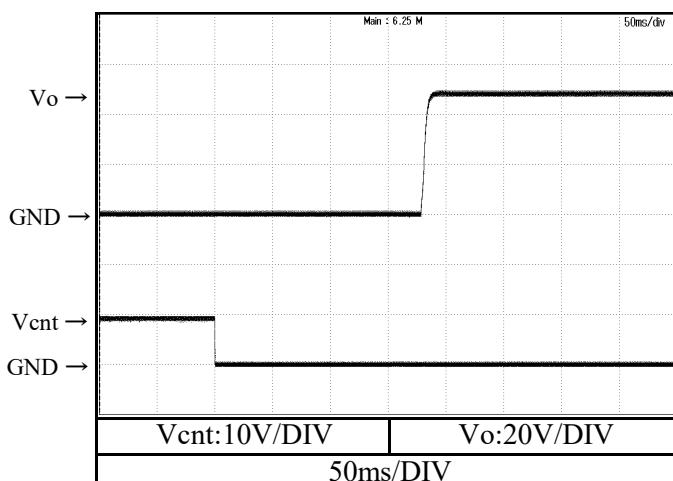
Io : 0 %

Tbp : 25°C

36V



48V



2.6 出力立ち上がり、立ち下がり特性 (ON/OFFコントロール時)

Output rise and fall characteristics with ON/OFF CONTROL

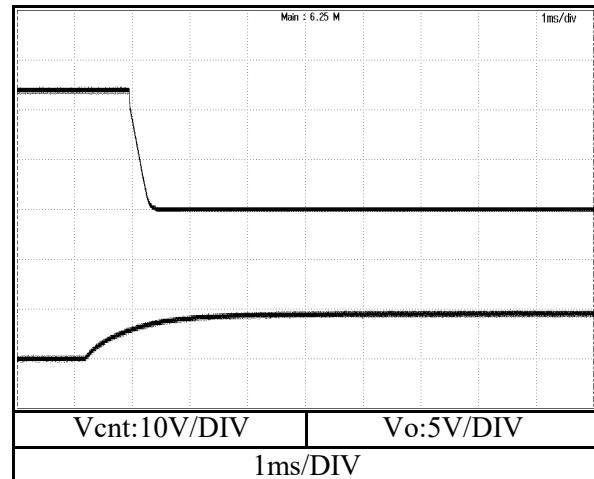
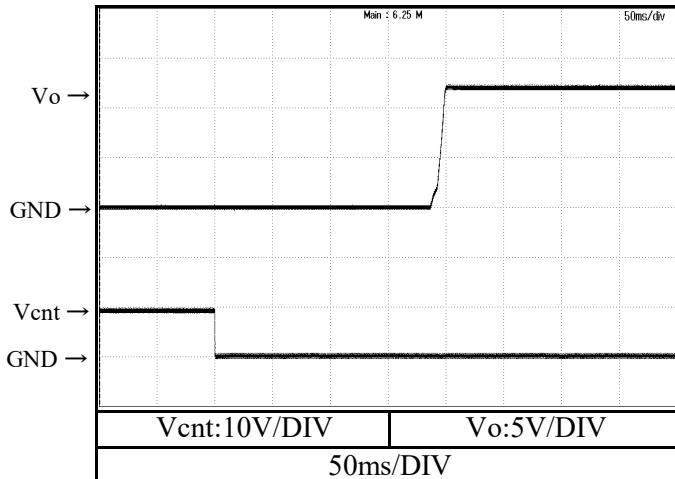
Conditions

Vin : 280VDC

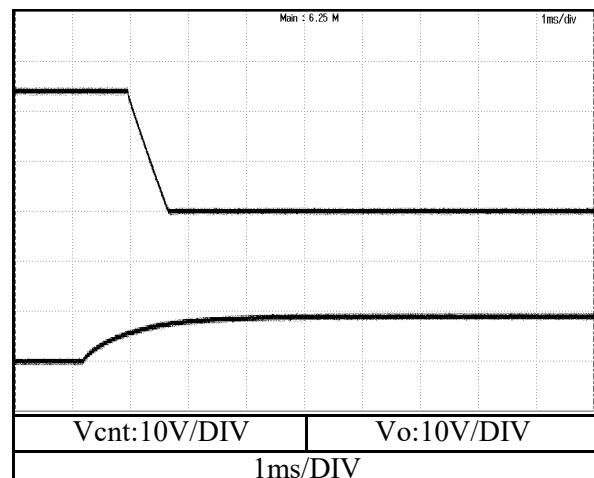
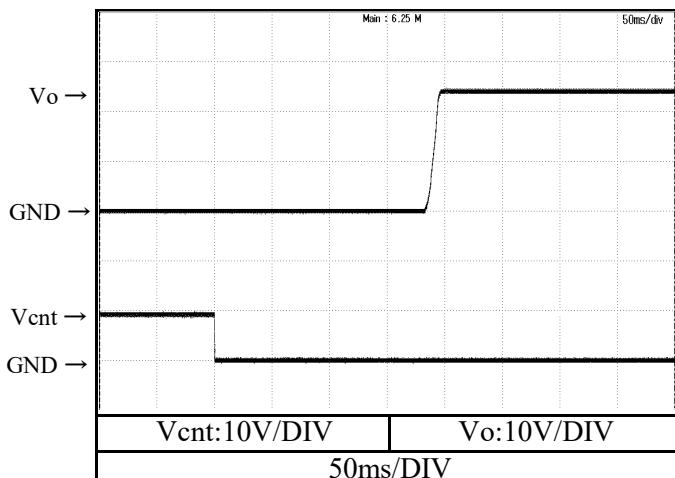
Io : 100 %

Tbp : 25°C

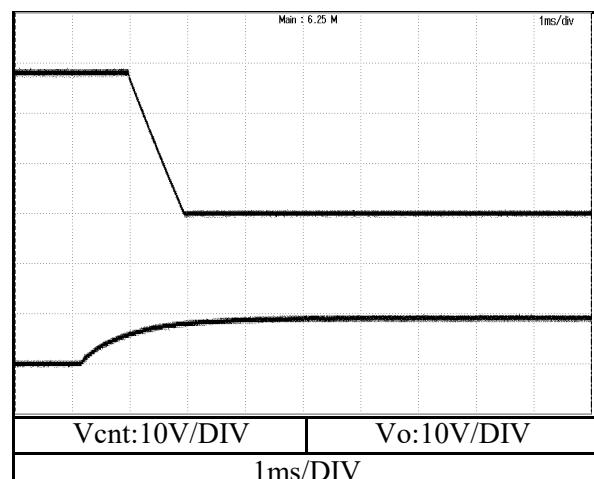
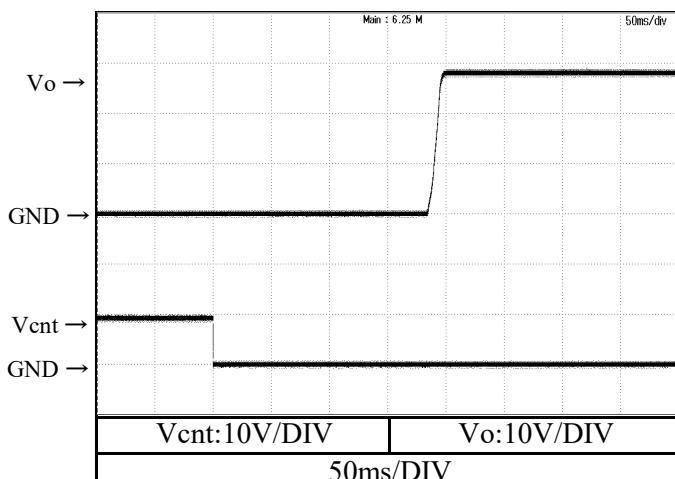
12V



24V



28V



2.6 出力立ち上がり、立ち下がり特性 (ON/OFFコントロール時)

Output rise and fall characteristics with ON/OFF CONTROL

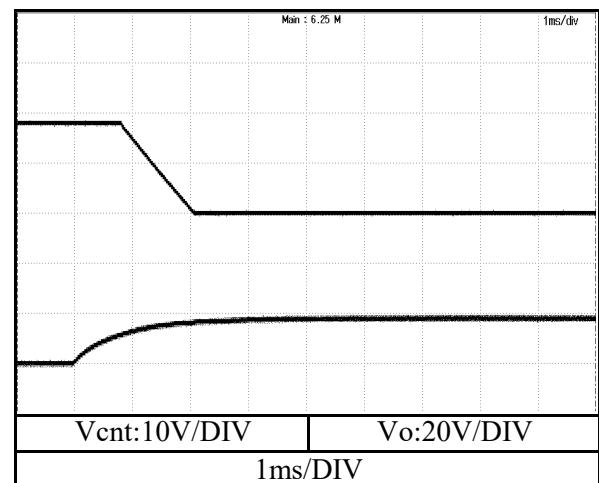
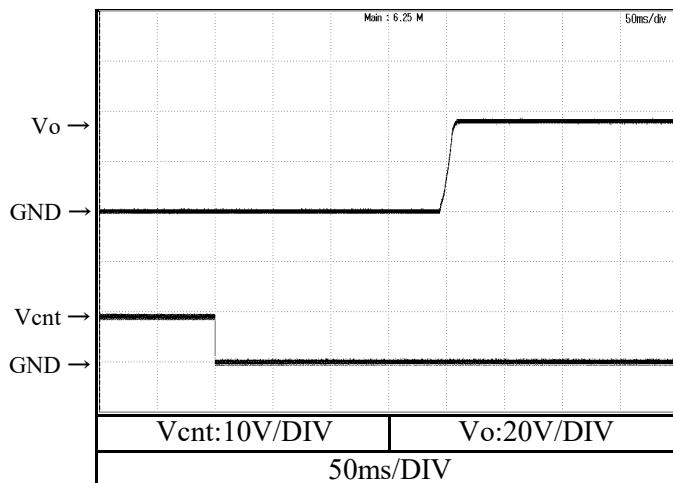
Conditions

Vin : 280VDC

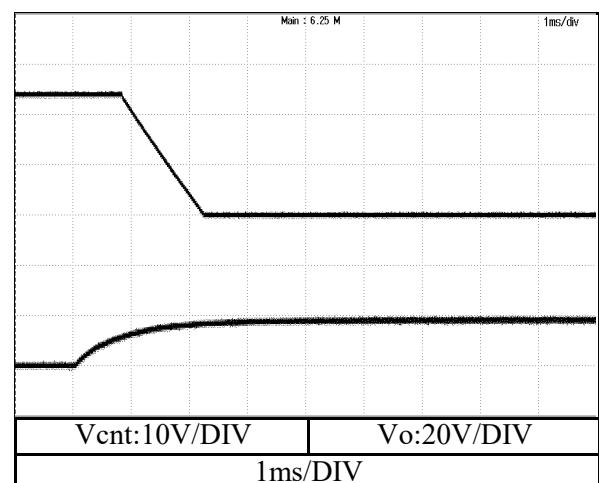
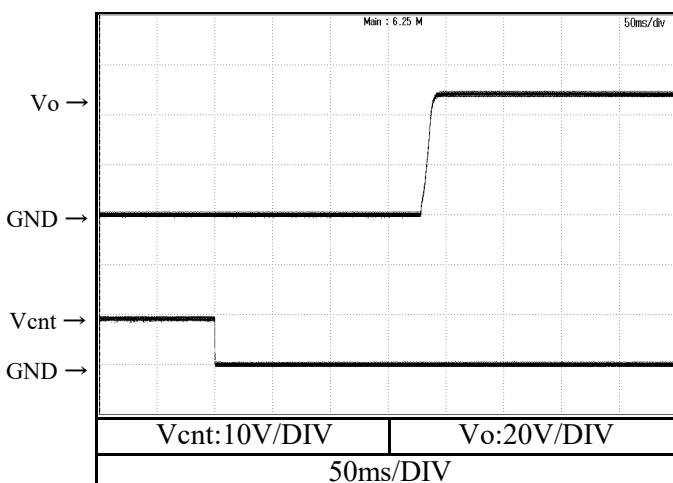
Io : 100 %

Tbp : 25°C

36V



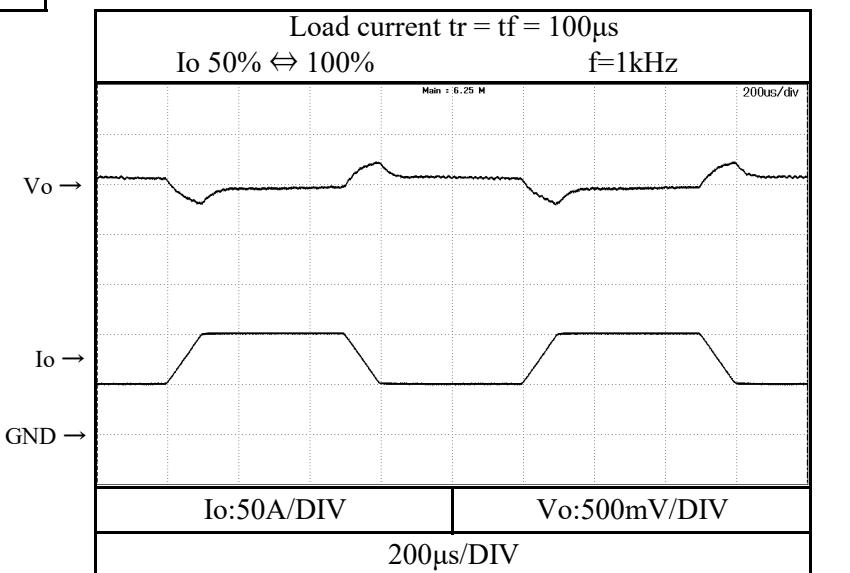
48V



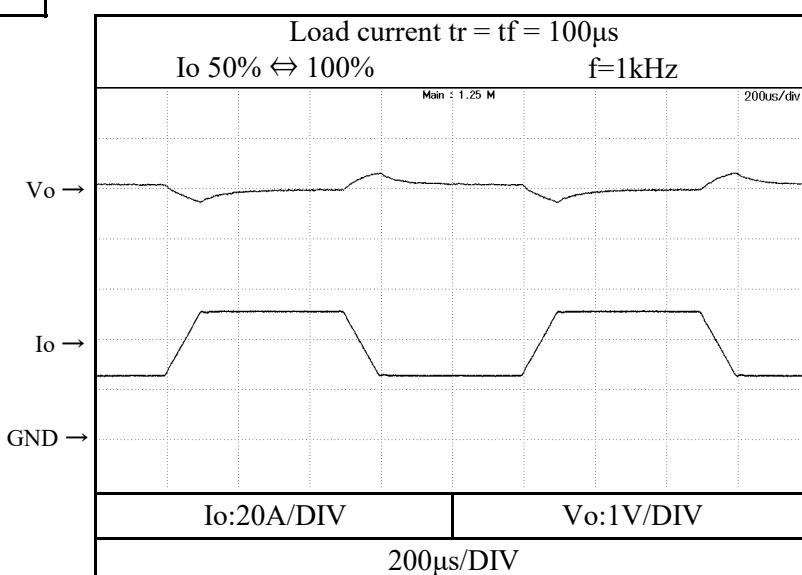
2.7 過渡応答(負荷急変)特性

Dynamic load response characteristics

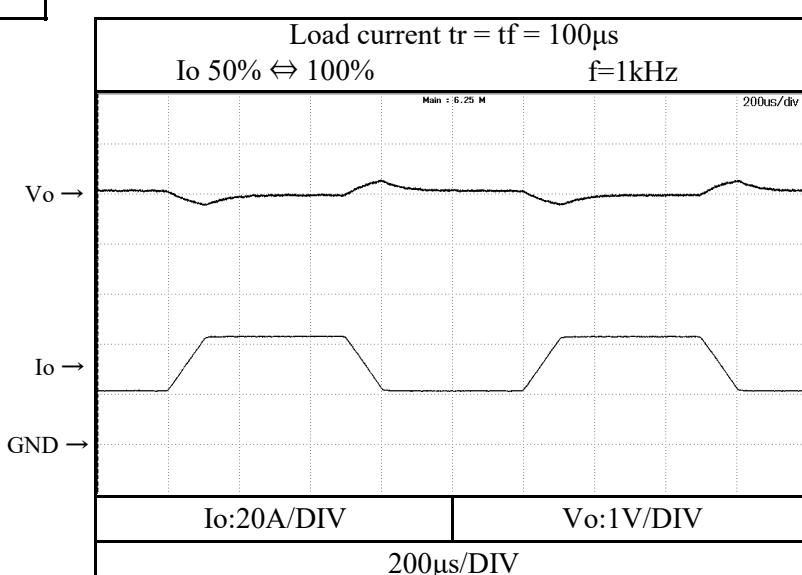
12V



24V



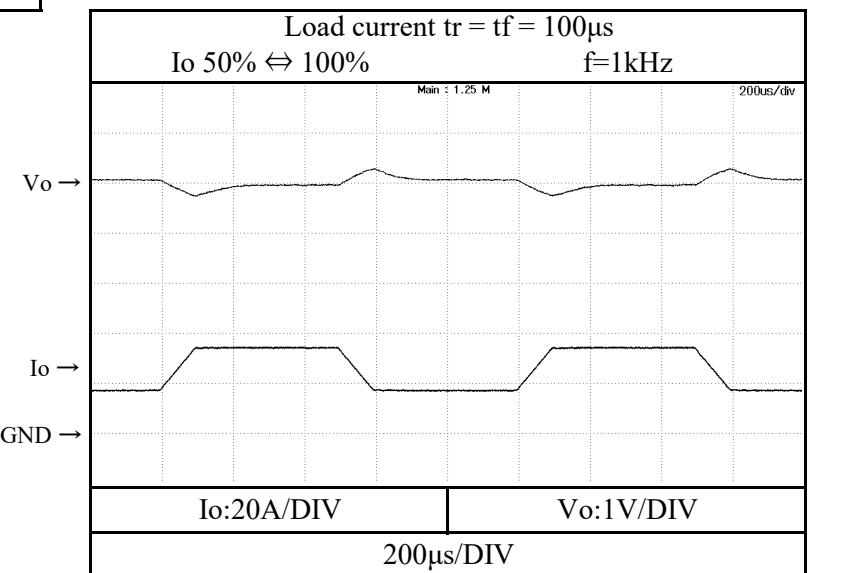
28V



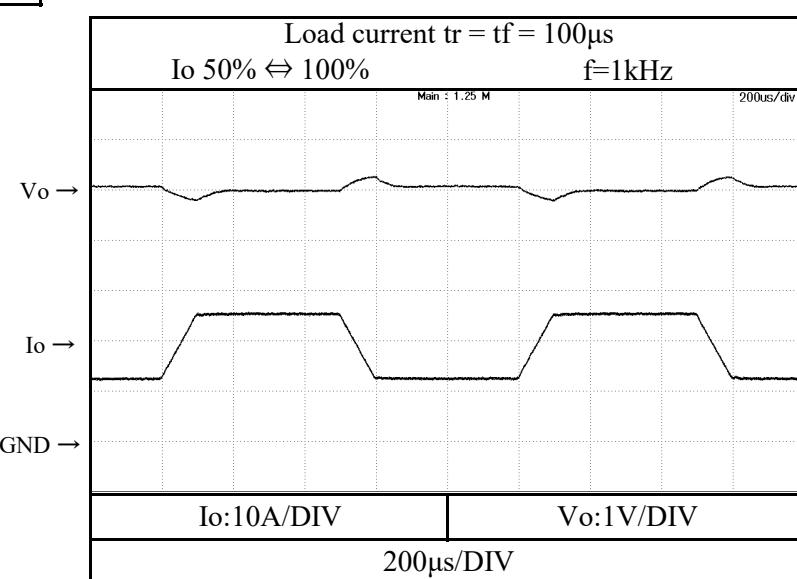
2.7 過渡応答(負荷急変)特性

Dynamic load response characteristics

36V



48V

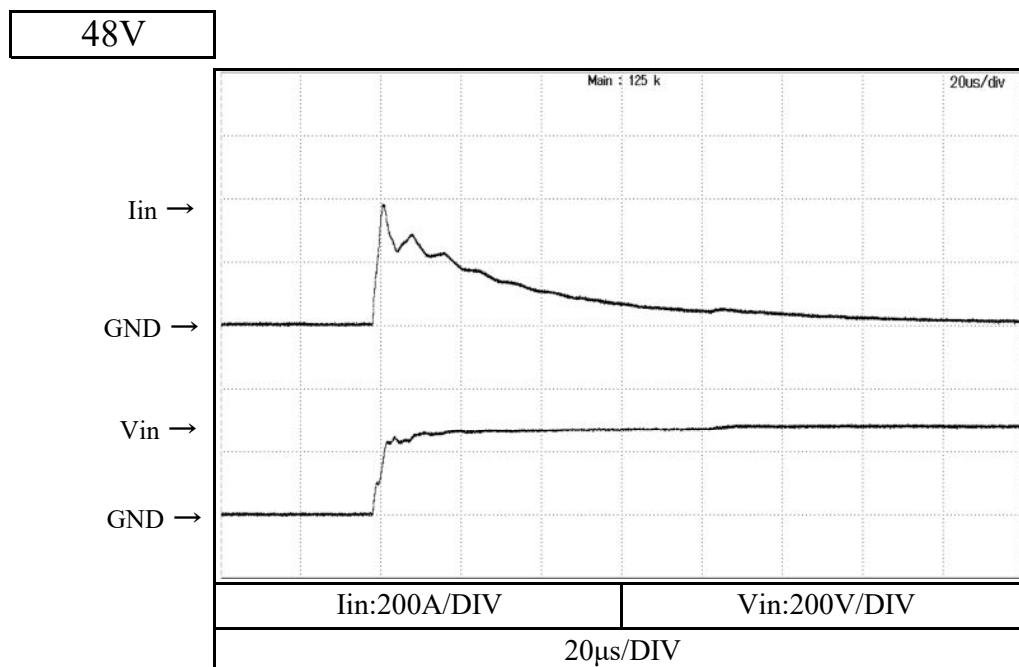


2.8 入力サージ電流(突入電流)特性

Inrush current characteristics

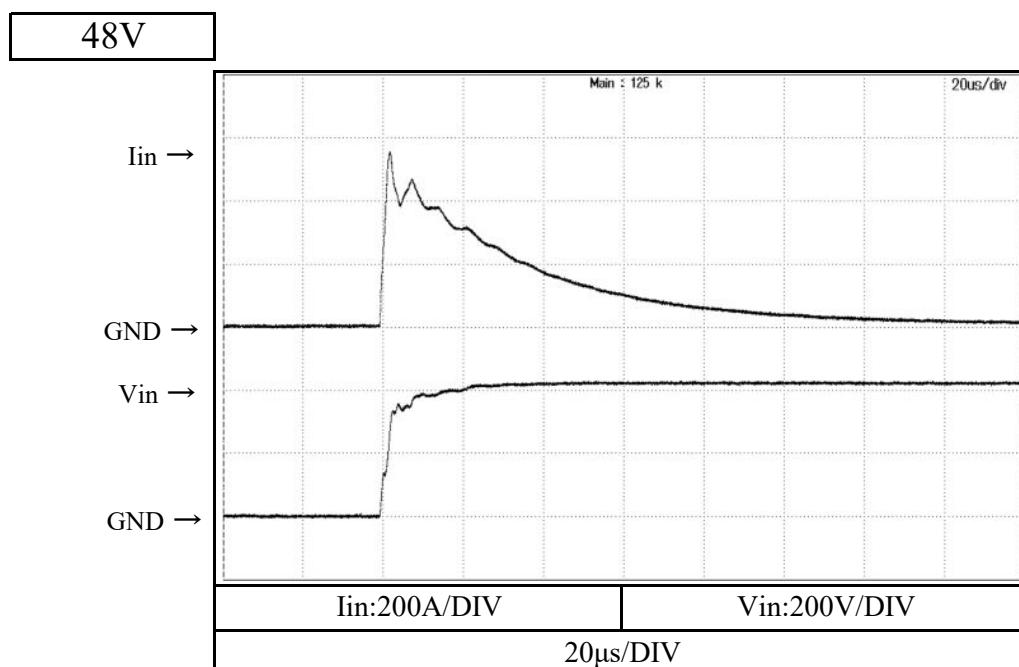
Conditions

Vin : 280VDC
Io : 100%
Tbp : 25°C



Conditions

Vin : 425VDC
Io : 100%
Tbp : 25°C



ここでは48V出力モデルのデータを提示しておりますが、入力突入電流は外付け入力コンデンサの容量値と電源内部の入力コンデンサの容量値が支配的な為、他の出力モデルにおいても同様の特性となります。

Although the data of 48V output model only is shown here, other output model data will be same, because inrush current performance depends on external input capacitance and internal input capacitance.

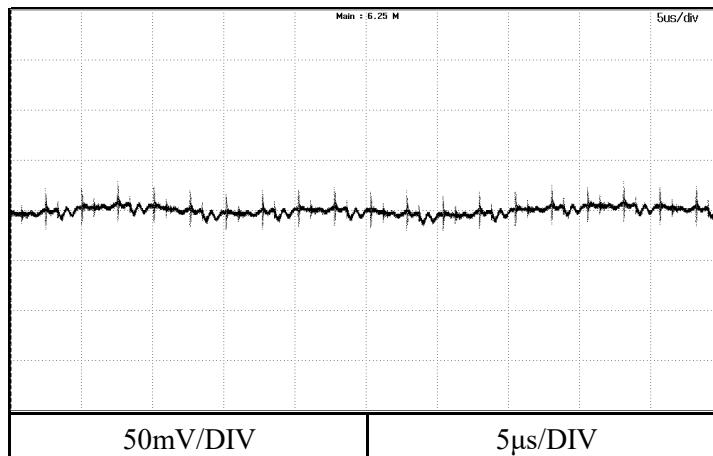
2.9 出力リップル・ノイズ波形

Output ripple and noise waveform

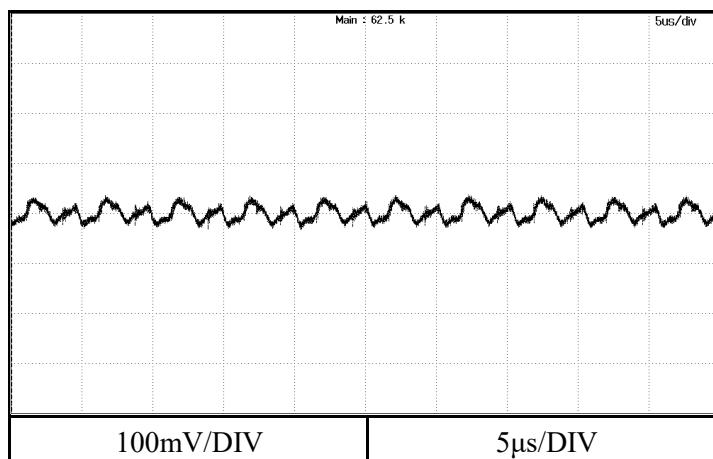
Conditions

Vin : 280VDC
Io : 100%
Tbp : 25°C

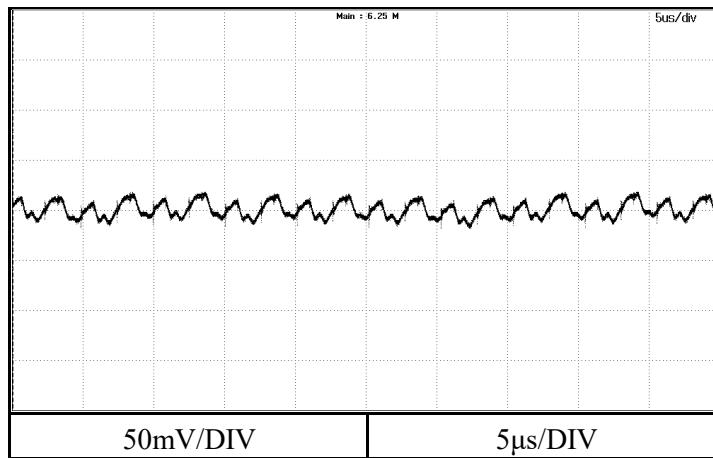
12V



24V



28V



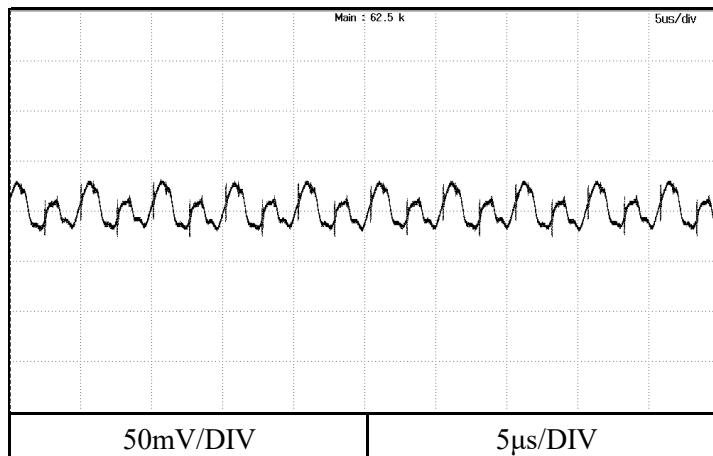
2.9 出力リップル・ノイズ波形

Output ripple and noise waveform

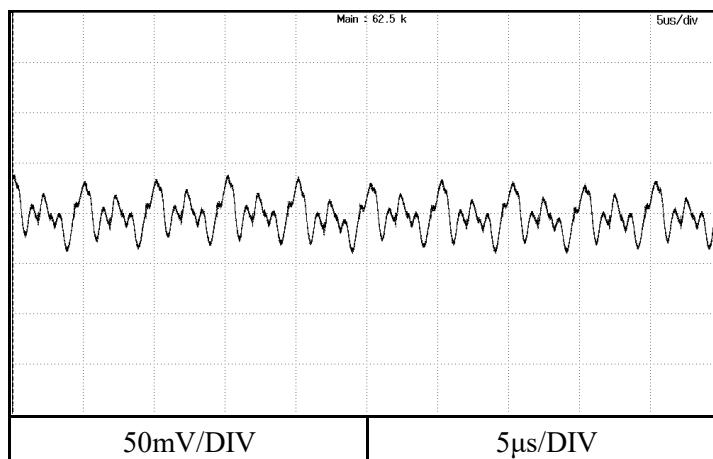
Conditions

Vin : 280VDC
Io : 100%
Tbp : 25°C

36V



48V



2.10 EMI特性

Electro-Magnetic Interference characteristics

(a) 雑音端子電圧(帰還ノイズ)

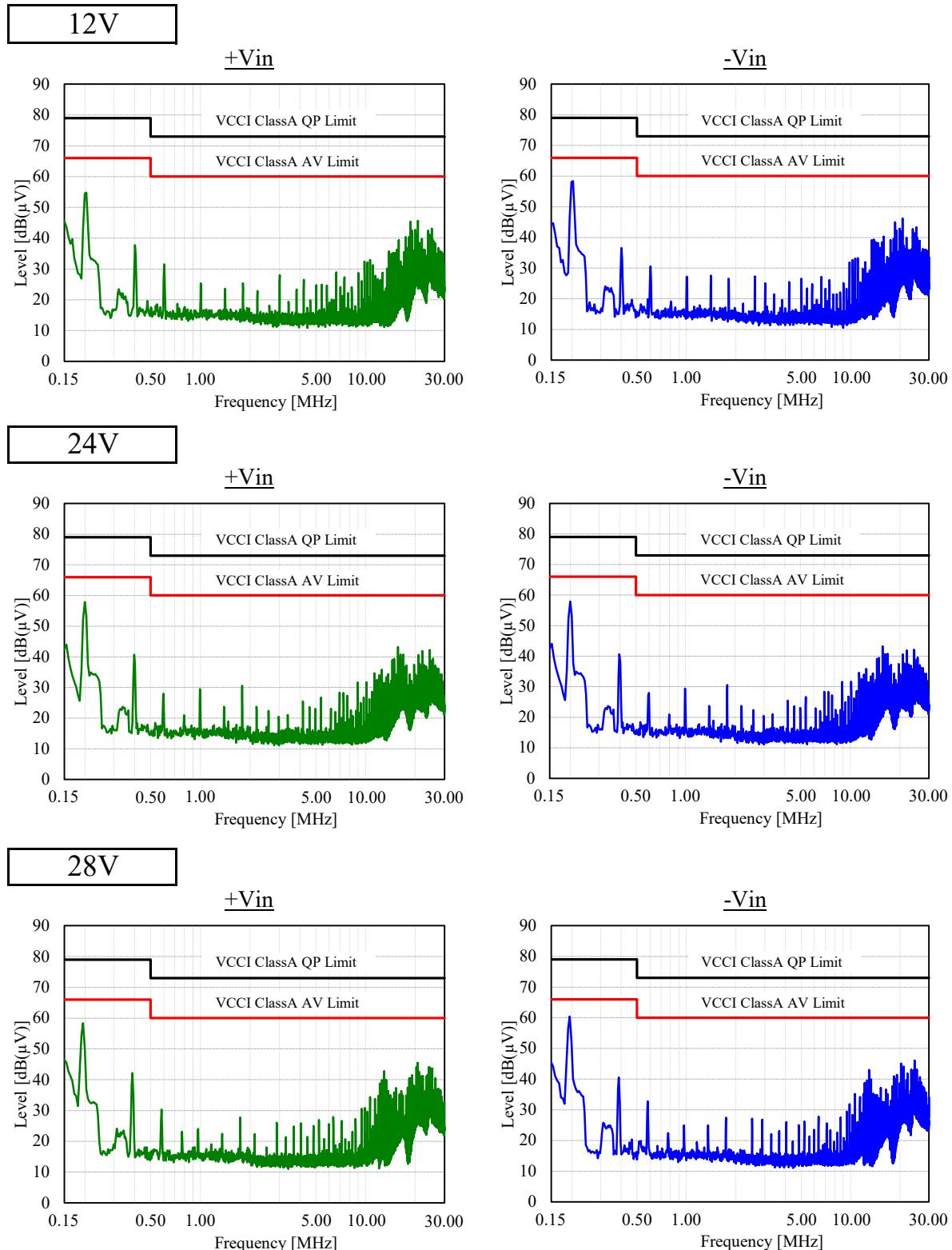
Conducted Emission Noise

Conditions

Vin : 280VDC

Io : 100%

Tbp : 25°C



2.10 EMI特性

Electro-Magnetic Interference characteristics

(a) 雑音端子電圧(帰還ノイズ)

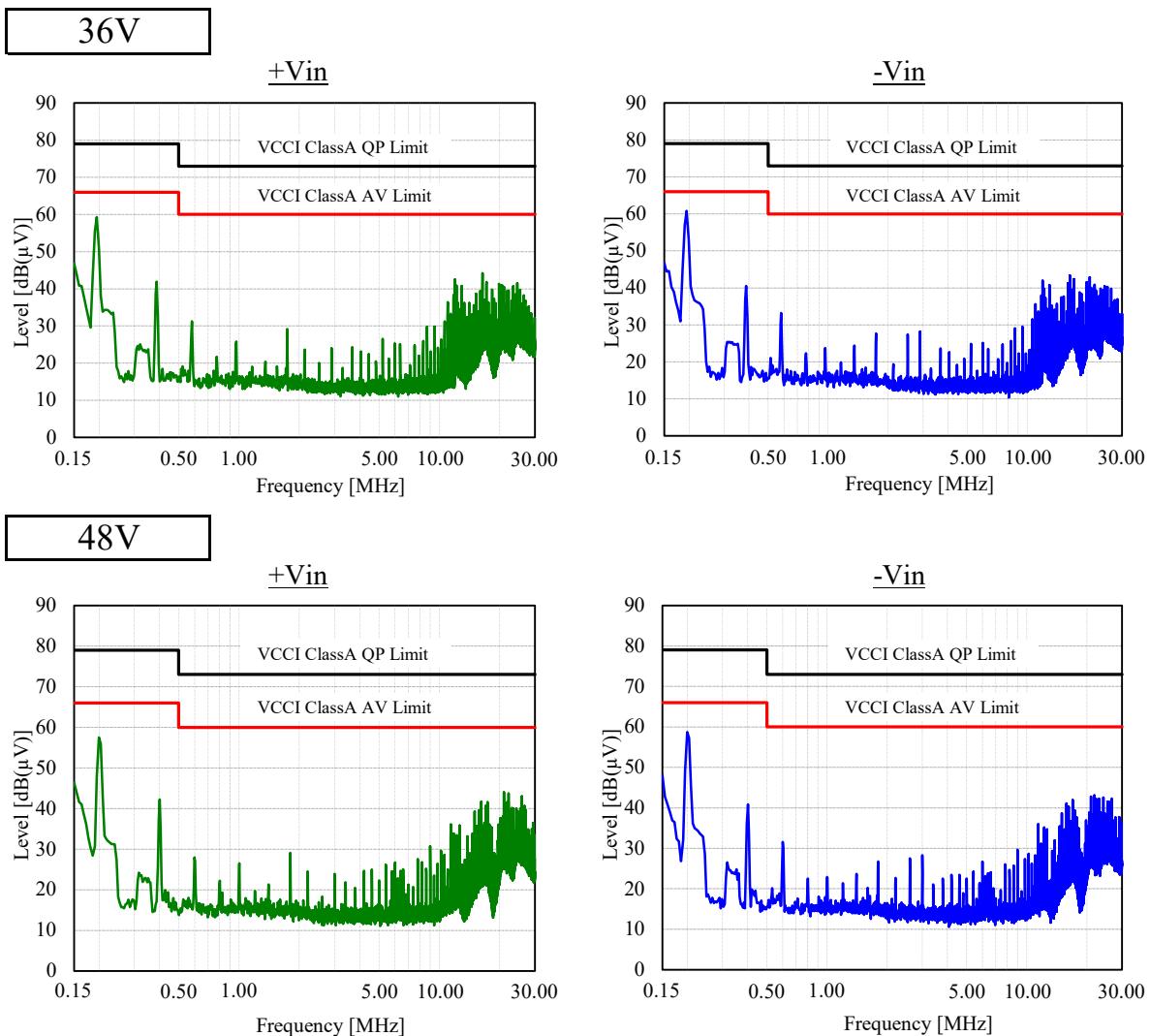
Conducted Emission Noise

Conditions

Vin : 280VDC

Io : 100%

Tbp : 25°C



2.10 EMI特性

Electro-Magnetic Interference characteristics

(b) 雜音電界強度(輻射ノイズ)

Radiated Emission Noise

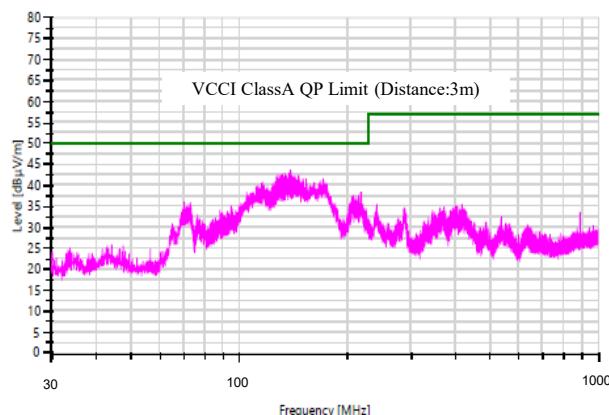
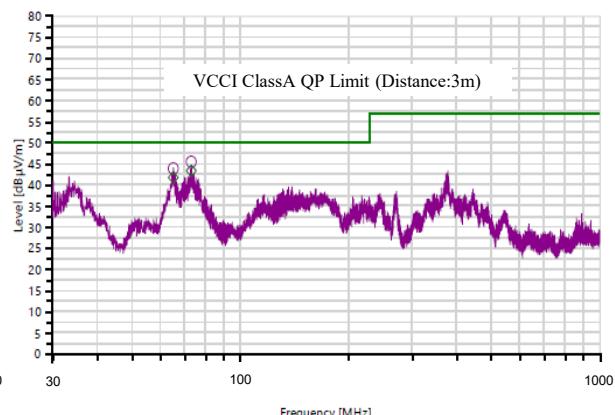
Conditions

Vin : 280VDC

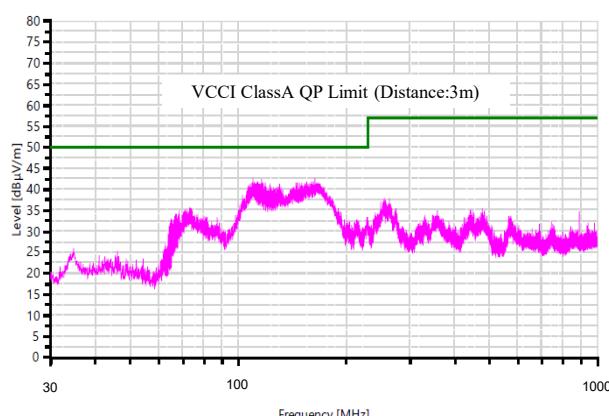
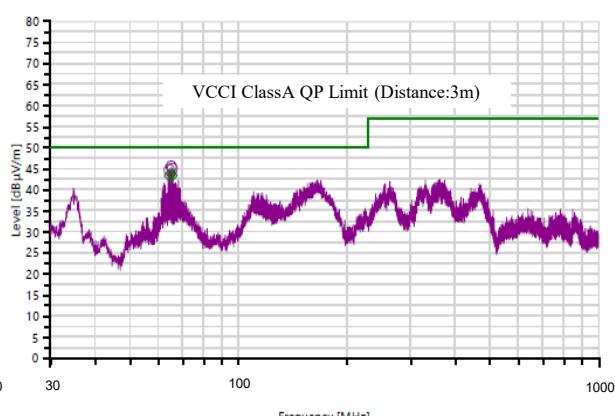
Io : 100%

Tbp : 25°C

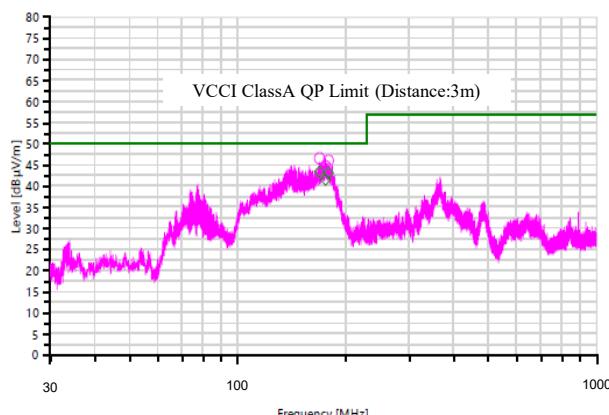
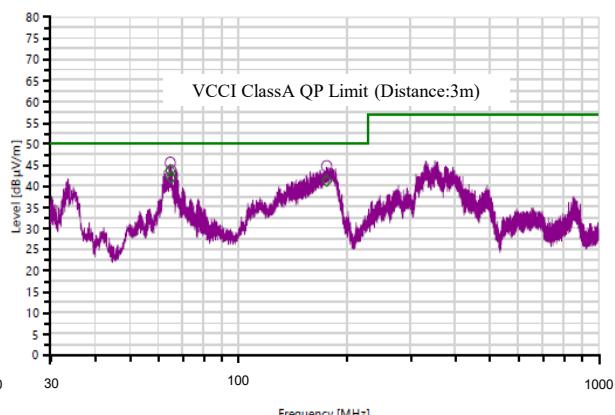
12V

HORIZONTALVERTICAL

24V

HORIZONTALVERTICAL

28V

HORIZONTALVERTICAL

2.10 EMI特性

Electro-Magnetic Interference characteristics

(b) 雜音電界強度(輻射ノイズ)

Radiated Emission Noise

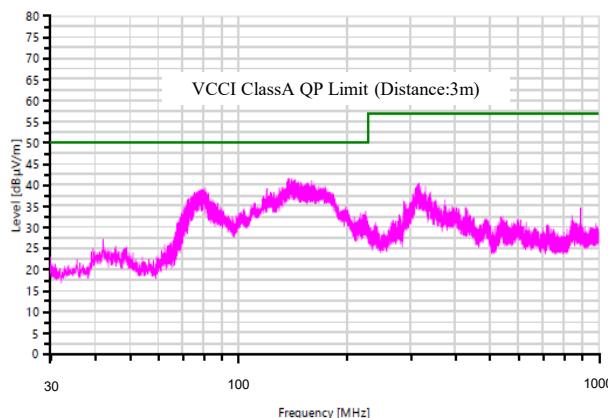
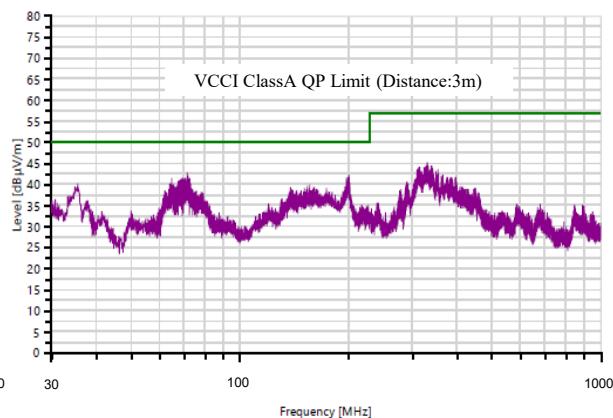
Conditions

Vin : 280VDC

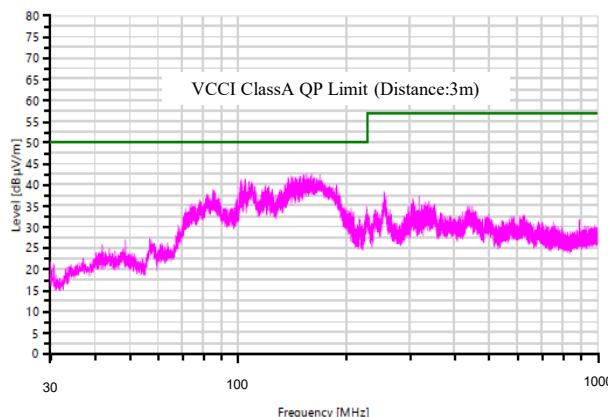
Io : 100%

Tbp : 25°C

36V

HORIZONTALVERTICAL

48V

HORIZONTALVERTICAL